MODEL AIRPLANE NEWS

IN THIS ISSUE

Willis Nye Masterplans

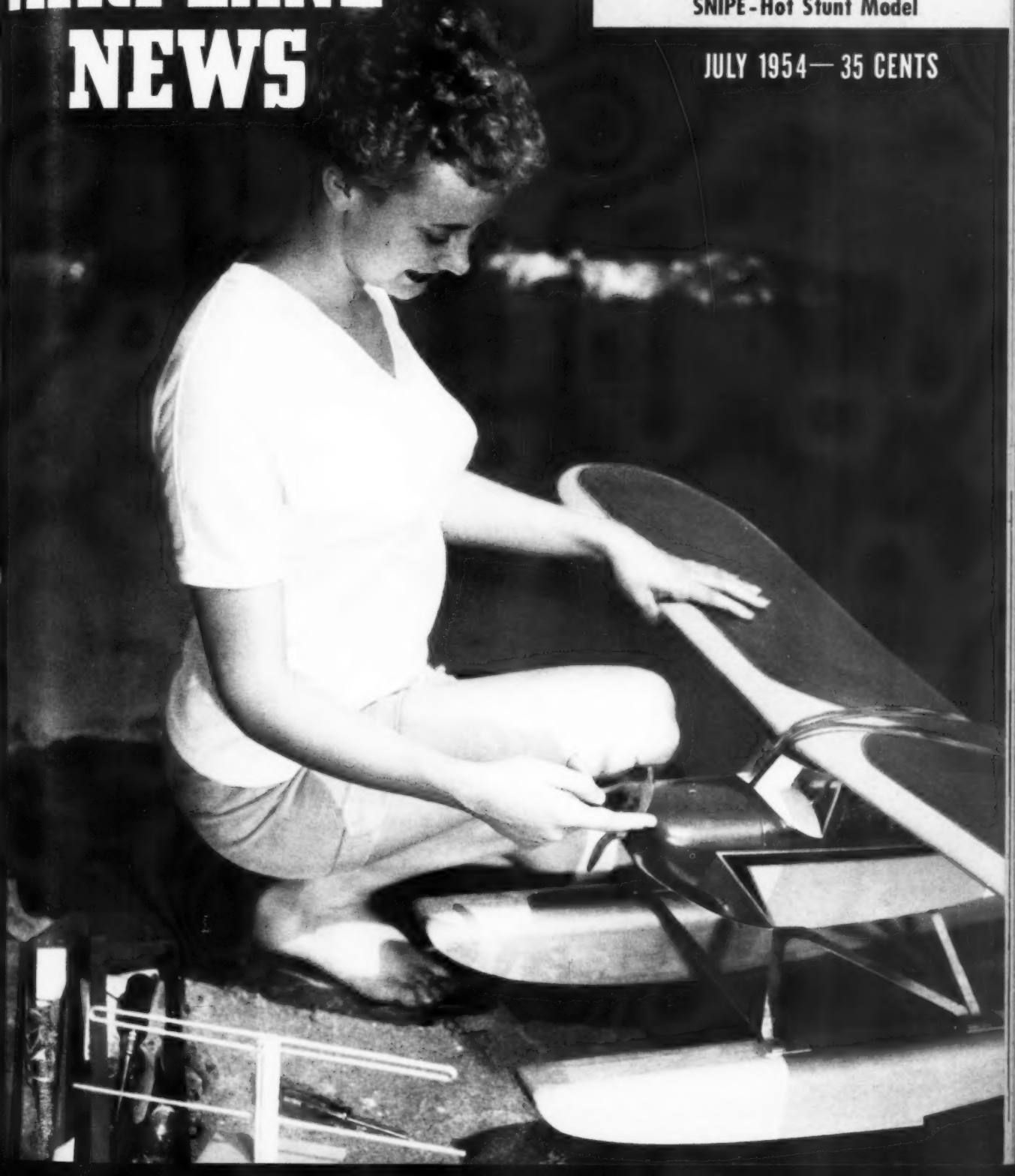
FRIEDRICHSHAFEN

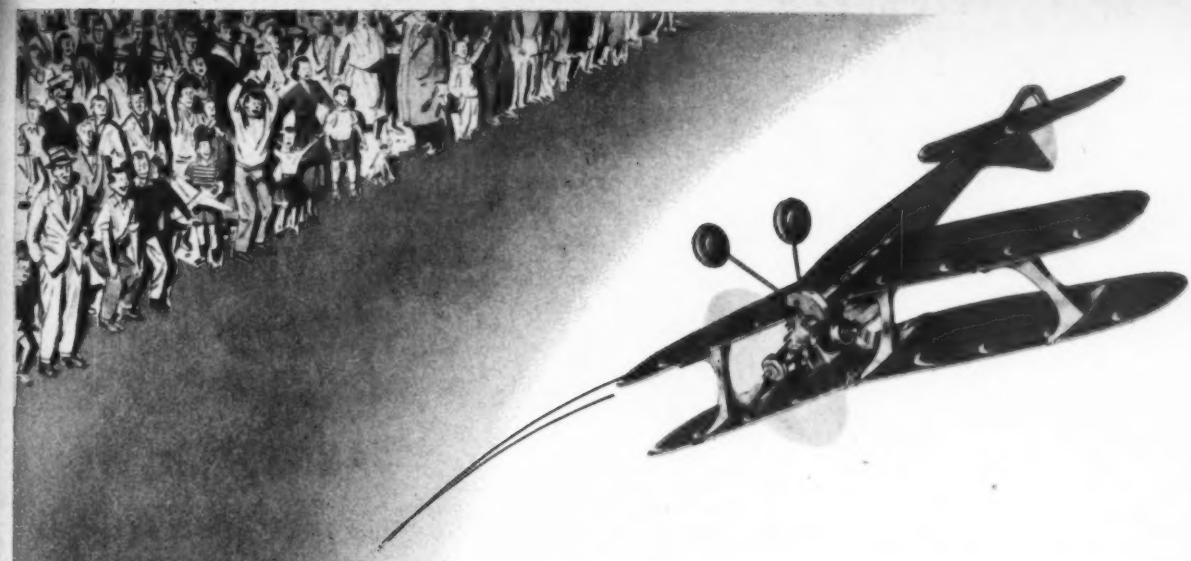
World War 1 German Bomber

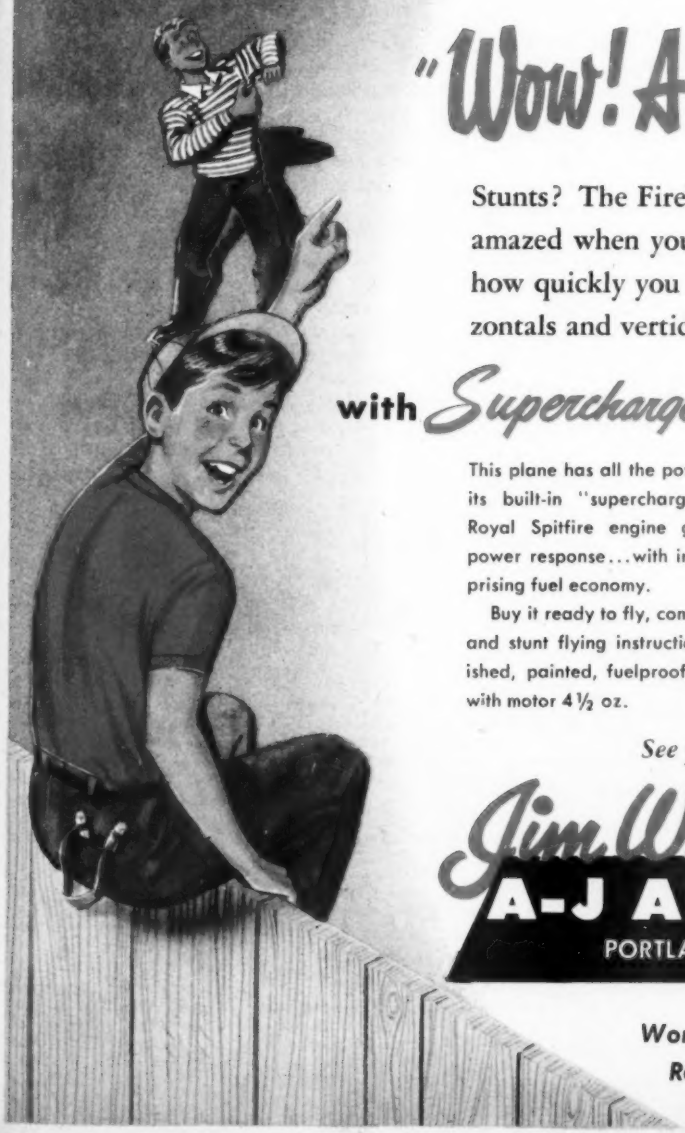
•

SNIPE - Hot Stunt Model

JULY 1954 — 35 CENTS







"Wow! A Double-Winger!"

Stunts? The Firebaby Biplane does 'em all. You'll be amazed when you fly it yourself—when you discover how quickly you can master the intricate eights, horizontals and verticals that were difficult before.

with *Supercharged* Royal Spitfire Engine

This plane has all the power you can use. With its built-in "supercharger" modification, the Royal Spitfire engine gives you tremendous power response...with instant starting and surprising fuel economy.

Buy it ready to fly, complete with control lines and stunt flying instructions. All parts are finished, painted, fuelproofed. Span 19", weight with motor 4½ oz.

Ready-to-Fly

$9.75

with engine

See your nearest hobby shop.

Jim Walker

A-J AIRCRAFT CO.

PORTLAND 12, OREGON, U.S.A.

World's Largest Manufacturer of Ready-to-fly Model Aircraft

MODEL AIRPLANE NEWS

JULY 1954 Vol. 11—No. 1

CONTENTS

CONSTRUCTION

Snipe 12
Stratohawk 16
Wild Hair Joe 20
Wedell Williams 24

ARTICLES

Can You Handle That Power? . 9
Laminated Props 14
How to Make Built-Up Fuselages 18
Tuning the Free Flight Engine . 23
Before and After 31

FEATURES

MAN at Work 2
Design Detail 7
Radio Control News 22
Friedrichshafen 26
Engine Review 30
Foreign Notes 32
Flash News 34

JAY P. CLEVELAND, President and Publisher
WILLIAM WINTER, Editor
WITTICH HOLLOWAY, Art Director

Contributing Editors: Peter Chinn (England), Don Grout, Ed Lorenz, Ted Martin, Bruce Wennerstrom, Harry Williamson

Executive and Editorial Office: 551 Fifth Avenue, New York 17, N. Y.

Advertising Manager, N. E. Sians, 551 5th Ave., New York 17; West Coast Adv. Mgr., Justin Hannon, 4068 Crenshaw Blvd., Los Angeles 43, Calif.

Editorial and Business offices: 551 Fifth Ave., New York 17, N. Y. Published monthly by Air Age, Inc., 1140 East West Highway, Silver Spring, Maryland. Jay P. Cleveland, President and Treasurer; Y. P. Johnson, Vice Pres.; G. E. Johnson, Sec. Entered as second class matter Feb. 1951 at the post office at Silver Spring, Md., under the act of March 3, 1879. Additional entry at New York, N. Y.

Price 35c per copy in U. S. Subscription Prices—U. S. and possessions: 1 yr. $3.50; 2 yrs. $5.50; 3 yrs. $7.50; Canada: 1 yr. $4.00; All other countries: 1 yr. $5.00. Payment from all countries except Canada must be in U. S. funds. Change of Address—Send to MODEL AIRPLANE NEWS, Subscription Department, 551 Fifth Avenue, New York 17, New York, at least one month before the date of the issue with which it is to take effect. Send old address with the new, enclosing if possible your address label or copy. The Post Office will not forward copies unless you provide extra postage. Duplicate issues cannot be sent.

Printed in United States

by William Winter

Many a floating free flight has drifted over the hill since last there was a rhubarb to match the controversy stirred up by Hal Roth's April issue article: Should We Scrap Microfilm? Indoor flying may be dead to all practical purposes but the activity, if you can call it that, seems to have more spokesmen than it has participants. That fan and model—symbolically an indoor job—were shot out of our hands in the cross-fire.

For the benefit of the latecomer, Roth stated that indoors has been dying a slow death and, in fact, is now almost nonexistent in the national picture, from which sad state it could be rescued by substituting a 100 square inch maximum model, covered with paper rather than microfilm, for both present stick and fuselage classes. A proposed system to prorate durations according to ceiling heights, coupled with the more easily built, lower performance craft, supposedly would encourage the average builder, especially the youngster, to participate; and would promote that participation by allowing the modeler to use a gym or hall, instead of the Cow Palace or Lakehurst dirigible dock.

If, for the purpose of this running discussion, we limit ourselves to comments from those qualified to talk about indoors—that is, the people who actually build and fly the stuff in competition—reaction varies in all degrees from Parnell Schoenky's approbation (though he would add the paper model in place of old style cabin and maintain the "mike" stick) to Dick Baxter and Walt Mooney's "phooey!"

"I couldn't resist dropping you a line," says George De La Mater, for years a staunch competitor and frequent winner at the Nationals indoor event, "when I saw the May MAN with the first straight dope on microfilm in any magazine in years (Facts about Microfilm, by John Zaic.) After Hal Roth's piece with the unfortunate title that appeared in April, I was a (*Continued on page 6*)

PLANE ON THE COVER

As a change of pace from the military planes covers, current or historical, what could be more pleasant than this excellent color transparency of pretty Mary Ann Kaufman and the seagoing radio control model? The plane is one of an experimental series of RC models developed by Joy Products of Menominee, Mich. Ralph Strutz is the photographer. The transmitter is a Citizen-Ship on 465 mc. Camera fans, note that Mr. Strutz sent in this shot unsolicited, collected nice fee. Do you have any suggestions?

NEXT MONTH'S COVER

Sparking MAN's 25th anniversary issue, Jo Kotula's wonderful then-and-now cover contrasts the ultramodern McDonnell Demon, Navy jet fighter, with a fighter that was in the news when the first issue of this magazine was published. From the days of that Boeing biplane F4B to this supersonic, atomic age, MAN has been continuously published. The 30-foot Boeing rattled along at 184 mph with a 500 hp engine. Demon? Times have changed!

Announcing 2 New OK Winners!

For PRICE, POWER, and PERFORMANCE

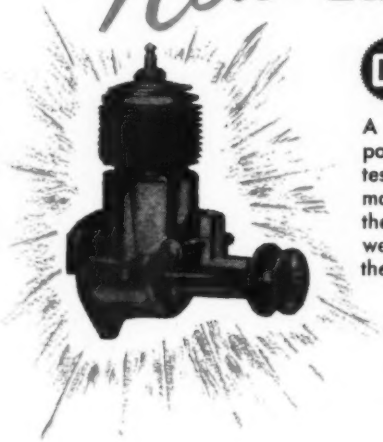
17TH ANNIVERSARY OK 1937 • 1954

A Complete Line of PROVEN Miniature Engines and Accessories

"OK" GLOW FUEL
"OK" DIESEL FUEL
Pint 85¢

"OK" GLOW PLUGS
Short or long — 59¢

1 New Engine



OK CUB .19

A WINNER . . . FOR POWER! This powerful new Cub is ideal for contest entries. Engineered to provide maximum Class A performance. Has the highest output on a power/weight ratio of any engine now on the market!

Displ.	.199
Bore	.655
Stroke	.590
Weight	2⅛ oz.

$8.95
As illustrated

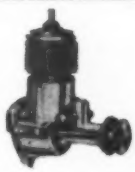
"OK"
CUB .049B
$4.95

"OK" CUB .074
$5.95

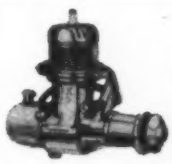
To make sure your Cub's a winner, always use "OK" Glow Fuel. A methanol-base fuel with extra punch. Assures quick firing, complete combustion — leaves no varnish or residue.

85¢ Pint

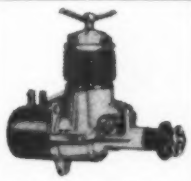
"OK" CUB .099
$6.95



"OK" CUB .14
$7.95



"OK" HOTHEAD
$10.95



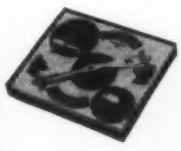
"OK" CUB DIESELS
.049 $5.95
.075 $7.50

2 New Kit

OK CUB .049B POWER KIT

A WINNER . . . FOR PRICE! Enjoy the thrill of assembling your own engine—and save money at the same time! Kit contains all the parts you need and easy-to-follow instructions.

only $3.95



"OK" COMBINATION PACKAGES
CUB .049x $5.75
CUB .074 . . . . . $6.75
CUB .099 . . . . . $7.75

SEE YOUR DEALER . . . Or write us direct

HERKIMER TOOL & MODEL WORKS

88 Harter St. Herkimer, N. Y.

... the HOBBYIST'S SUPERMARKET of SUPER SAVINGS!

NOWHERE IN THE WORLD will you find as large a selection of AIRPLANES • ENGINES • SPEEDBOATS RACE CARS • ACCESSORIES • ETC.

CHECK THIS LIST!

LOOK! Only AHC Gives You All These Terrific EXTRAS

1. One year subscriptions to Model Airplane News, Air Trails and Flying Models or their equivalent value to our regular customers.
2. 14-Day Money Back guarantee on unused purchases.
3. Sensational BONUS with every gas engine purchased! ITEMS WORTH OVER $5.00 FREE OF EXTRA COST. See box below.
4. BONUS with gas planes! ITEMS WORTH $2.00 FREE OF EXTRA COST. See box below.
5. No postage or packing charges for orders of over $1.00 (include 25c if order is under $1.00). We insure safe delivery ANYWHERE IN THE WORLD. Outside of U.S.A. (except APO & FPO) add 10% for postage (minimum 50¢).
6. Membership in "Modelcrafters of America," the club that keeps you up to date on gas modeling and SAVES YOU MONEY ON YOUR PURCHASES. Over 100,000 members!
7. No "minimum" orders. Any order is welcome.
8. 24-hour service. Mail addresses coast-to-coast airmail your orders to our N. Y. office for immediate shipment to you.
9. Most complete model stock in America—gas, rubber, solids, etc. If it's advertised, we can usually supply it.
10. Competent understanding of your modeling problems.
11. 128-page giant 2-color illustrated catalog FREE with every order.

SATISFACTION GUARANTEED OR YOUR MONEY BACK

AIRPLANES

FREE-FLIGHT PLANES

Baby Zephyr 28" AA	.98
Badger 72" A-B-C	8.95
Beaver 44" AA	2.95
Bird Dog 36" FF AA	2.95
Bootstrap 40" AA	2.50
Buccaneer B Special 84" B	3.95
Champion 36" A-AA	2.50
Clipper 34" AA	2.95
Cloud-Copter TR 28" AA	3.50
Cloud-Copter D2 26" AA	2.95
Commanche 36" AA	2.75
Dakota 24" AA	2.75
Folly 32" AA	1.75
Fu-bar 36" AA	1.75
Fu-bar 66 66" B-C	6.95
Hawk 27" AA	1.50
Jasco Rival 44" AA	2.75
Jasco Streak 32" AA	1.95
Junior Phoenix 36" A	2.25
KIWI 38" AA	2.50
KIWI 44" A	4.50
Lift Master 34" AA	2.25
Lil Rascal 27" AA	1.50
Livewire Cruiser 66" A-B	14.95
Luscombe Sedan 76" C-D	7.50
Mini-Hogan 34 34" AA	1.95
Mini-Hogan 48 48" AA	2.95
Navajo 36" AA	2.50
PAA Master 38" AA	2.50

Buried in This Ad

are most of the new items. Sometimes there isn't time or space to list all of them. But, if available anywhere, we have it.

Pacemaker 40" AA	2.50
Phoenix Skipper 36" AA	2.25
Powerhouse 41" A	3.95
Powerhouse 86" B	4.95
Privateer Flying Boat 36" FF AA	2.95
Profile Powerhouse 24" AA	1.00
Sandy Hogan 70" B-C	8.95
Shadow 32" AA	1.95
Sioux 36" AA	2.75
Skylark 31" AA	2.00
Sniffer 29" AA	1.75
Super Brigadier 88" B	4.95
Taylor Cub 38" AA	2.95
Yank 23" AA	1.50
Zeek 33" AA	2.50
Zeek 80" A-B	4.95

CLOSEOUT SPECIALS

Diamond Demon 48" B, Reg. 2.95	1.50
Jersey Javelin 40" B, Reg. 3.95	1.95
Pacer C—60" C, Reg. 4.95	3.50
Boomer 48" A-B, Reg. 2.95	1.95
Rocketeer 40" A-B, Reg. 2.95	1.95
Stratos 42" A, Reg. 2.95	1.95
Zipper 32" A, Reg. 2.50	1.95

RADIO CONTROL PLANES

Helioplane 39" AA	3.95
Piper Tri-Pacer 39" A-B-C	10.95
Bootstraps "A-RC" 84" AA-A	3.95
Brigadier RC 38" AA-A	3.95
Kenhi Bumer'd 72" A-B-C	10.95
Kitten 34" AA	3.95
Livewire RC 48" AA	6.95
Livewire Cruiser 66" A-B	14.95
Royal Rudderbug 62" A	6.95
Livewire Sr. 66" A	14.95
Buccaneer B Special 84" B	3.95
Buccaneer C Special 72" C	7.95
Super Brigadier 88" B-C	4.95
Super Buccaneer 90" C-D	10.95
Custom Cavalier 108" D-E	17.80
Luscombe Sedan 76" C-D	7.50

U-CONTROL PLANES

A/2 Twin 28½" AA	2.95
Aeronca Sedan 38¼" A-B-C	4.95
Aeronca Sedan 22" AA	1.95
Aeromite 17" AA	4.95
Air Racer 18" AA-A	3.39
All Amer. Trainer 21" AA	1.75
All Amer. Stunt Trainer Jr. 35" A-AA	2.50
All Amer. Stunt 36" A-B	4.95
All Amer. Sr. Stunt 61" B-C	5.95
American Boy 18" AA	1.00
Baby Barnstormer 23" AA	2.95
Baby Clown 22" AA	1.50
Baby Era 18" AA-A	2.50
Baby Era Bipe 16" AA	2.80
Barnstormer 47" A-B	5.95
Bearcat 38" C-D	4.95
Beachcraft 16" AA-A	2.95
Bel-Air 18" AA-A	2.95
Bipe Stunt Train. 22" B-C-D	3.95
Boeing F4B4 17½" AA	2.95
Boeing P26A 18" AA	2.95
Bravo 36" A-B-C	4.75
Cat's Whiskers 40" A-B-C	3.95
Cessna 22" AA	1.95
Cessna 36" B-C	5.95
Chief 53" B-C	6.95
Circus King 40" B-C	2.95
Combat Sky Boa 36" A-B	2.95
Corsair 17" A-AA	2.95
Corsair 36" B-C	5.95
Curtis P40F 20" AA	3.95
Curtiss Hawk P6E 17½" AA	2.95
Curtiss Hawk P6E 23¾" A	4.95
Dynamic 26" A-B	3.50
F & B Basic Trainer A-B-C	3.95
Fire Baby 19" AA	2.80
Firebaby Biplane 19" AA	3.50
Flip-Flop 24" A-B	3.50
Flying Clown 28" A-B-C	1.95
Focke Wolfe 190 17" AA	2.95
Fokker D-VII 32½" UC A-B-C	5.95
Fokker D7 14" AA	2.95
Good News 30" A-B-C	8.95
Great Lakes Trainer 27" A-B	5.95
Gruman Guardian 50" A-B-C	8.95
Guided Star 24" A-B-C	5.95
Guided Starlet 24" AA	2.75
Hell—Razor 9" AA	2.00
Hell—Razor 14" A	5.95
Hell—Razor 18" B	4.50
Hell—Razor 18" D	6.95
Howard Ike 20" AA	3.00
Howard Pete 30" B-C-D	5.95
Infant Wagon 20" AA	1.95
Junior Puddlejumper 19" AA	1.95
Junior Stunt 9 27" AA-A	3.40
Junior Stunt 19 34" A	3.95
Junior Stunt 29 40" B	4.95
Kenhi Panther 48" B-C	6.95
Kenhi Wildcat 37" A-B	4.45
Kenhi Bobcat 37" A-B	3.95
Kenhi Cougar 51" B-C	6.95
Kenhi Mustang 48" B-C	6.95
Kay 29" B-C	5.95
Kay—Dot 18" AA-A	2.95
Knockout 18" AA	2.50
Lil Duper Zilch 42" A-B	3.95
Little Ace 18" AA-A	1.95
Little Bipe 16" AA-A	1.50
Little Devil 18" AA-A	1.50
Little Mercury 18" AA	1.50
Little Mustang 18" AA	1.95
Little Sabre 18" AA	1.95
Little Schmoe 17" AA	1.80
Little Stinker 16" AA	2.80
Lockheed Starfire 23" Jetex	2.49
MPC-7 39" B	6.95
ME 109 Jr. (P.D.O.) 20" AA	1.50
Mentor T-34A 33" A-B	4.95
Minnow 28" A-B-C	8.95
Mini-Zilch 19" AA	1.25
Monocoupe 36" B-C	4.95
Monocoupe "90 A" AA	1.80
Mr. Mulligan 32" B-C (Sterling)	4.95
Mustang 37" A-B (Berkeley)	5.95
Mustang (Sterling) A-B-C 38"	2.95
Mustang (Veco) 48" B-C	7.95
Mustang (Enterprise) 17½" AA-A	1.95
Mustang (Monarch) 20" AA-A	2.95
N.A. P51 16" AA (Comet)	2.95
No. Amer. AT6 (SNJ) 31" A-B-C	4.95
No. Amer. AT6 18" AA	1.95
N. A. Savage 26" AA	6.95
Papoose 32" A	3.95
Peter Pan 16" AA	1.50
Piper Cub 22" AA	1.95
Piper Cub 35¼" A-B-C	4.95
Piper Vagabond 36" A-B-C	3.95
Pitts Special 25" A-B	4.95
Polish Fighter 36" B-C-D	3.95
Primer 18" AA	1.40
PT Trainer 26" A-B	1.95
Puddle Jumper 19" AA	1.00
Quest 30" B	2.95
Redskin 31" A-B	4.95
Ringmaster 42" B-C	3.95
Ryan S.T. 36" B-C	5.95
Ryan S.T. AA 17½"	2.85
Scientific 2 in 1 Kit 18" AA	1.50
Scout 24" AA	2.50
SE 5 17" AA	2.50
SE 5 14" AA	3.95
SE 5 32" B-C-D	5.95
Senior 9 27"	3.40
Senior 19 34"	3.90
Senior 29 39"	4.95
Senior Puddlejumper 25" A-B	1.95
Sharpy 47" C-D	4.95
Shoestring 28" A-B-C	5.95
Stylaedor 18" A-AA	2.50
Slick Trick 18" AA	1.95
Small Fry 17" AA-A	2.80
Smoothie 52" A-B	7.95
Space Buggy (incl. engine) AA	6.95
Space Master 24" AA-A	2.25
Speedster 12" AA	2.50
Spitfire 20" AA	3.95
Spitfire Jr. 20" AA	1.50
Spitfire 18" AA	2.95
Sport Racer 18" AA	1.50
Sportwing 36" A-B-C	3.95
Squaw 39" A-B-C	8.75
Stinger 48" B-C-D	6.50
Stinson 22" AA	1.95
Stuntwagon 58" D	7.95
Super Clown 38" B-C	2.95
Super Duper Zilch 52" C-D	8.95
Super Knock-Out 24" A-B	3.50
Super Puddlejumper 28" AA-A	2.95
Super Squirt 21" (Jet)	6.95
Super Stunt Runt 20" A	2.25
Super Zenith 23" A	3.50
Sweet Chariot 18" AA-A	2.50
TD1 24" AA	9.95
T-28 N.A. Trainer 30" B.C.	5.95
Texan AT6 18" AA	1.95
Thunderbolt 40" C-D	4.95
Trail Blazer 24" B-C-D	2.95
Trister Improved Trainer	3.95
Trister Profile 32" A-B	2.80
Trister Profile 38" B-C	3.50
Twin Mustang F82—18" AA	2.95
Typhoon 17" AA	2.95
Vampire 40" B-C	4.50
Viking 51" C-D	6.75
Vixen 21" AA	1.95
Waco 33" B-C	5.95
Waco Cabin 12" AA	1.50
Warhawk 17" AA-A	1.95
Warhawk 32½" B-C	5.95
Warhawk Bark. 48" A-B-C	4.95
Warrior 36" A-B-C	4.95
Wee Duper Zilch 34" AA	2.95
Wee Willie 18" AA-A	1.95
Whirlaway 11" AB	3.95
Wing Ding 18" AA-A-B	2.25
Wing Dingus 16" AA	2.25
Yak (P.D.O.) 38" B-C	2.95
Yak Jr. (P.D.O.) 20" AA	1.50
Yak (Sterling) A-B-C	2.95
Yank 23" AA	1.50
Zenith 19" AA-A	2.50
Zero 18" AA	2.95
Zero, Jr. 20" AA-A	1.80
Zilch X-Pendable 38" A-B-C	3.95

READY-TO-FLY PLANES Complete With Engines

Aeromite 17" (Assembled)	9.95
AJ Firebaby 19" (Assembled)	7.85
Firebaby Biplane 19" (Assembled)	9.75
TD-1 24" (Assembled)	19.95

ENGINES

GLO ENGINES

Atwood 049 (UC)	(AA)	4.50
Atwood 049 (FF)	(AA)	4.75
Atwood 051	(AA)	5.50
Atwood Cadet	(AA)	3.95
Cameron Ring	(A)	9.95
Cameron Lapped	(A)	9.95
Cameron .19 two speed	(A)	11.95
Cameron .09 Marine	(A)	9.95
Cameron .09 Marine Diblejet	(A)	11.95
Forster F.29 Glo	(B)	11.20
Forster F.31 Glo	(C)	11.20
Fox 19	(A)	12.50
Fox 29	(B)	14.95
Fox 35	(C)	14.95
Fox 59	(D)	22.50
Infant Torpedo	(AA)	5.50
K & B Glo Torp 29	(B)	15.95
K & B Glo Torp 32	(C)	15.95
K & B Torpedo 19	(A)	13.95
K & B .15 (2-speed)	(A)	11.95
K & B 19 (2-speed)	(A)	16.95
K & B Torpedo 23	(B)	13.95
K & B Torpedo 15	(A)	10.95
K & B Torpedo .09	(AA)	7.95
McCoy 9	(A)	7.95
McCoy 19 Sport	(A)	9.95
McCoy 19 R.H.	(A)	12.95
McCoy 29 Sport	(B)	11.95
McCoy 29 R.H.	(B)	16.95
McCoy 60 R.H.	(C)	24.95
O & R 23 Rv Deluxe	(B)	11.95
O & R 29 Glo	(B)	13.95
O & R 33 Glo	(C)	13.95
O & R 29 Marine	(B)	14.95
O & R 60 Glo	(D)	13.95
O.K. Cub .099	(A)	6.95
O.K. Cub .099 Phas.	(A)	7.75
O.K. Cub .049X Phas.	(AA)	6.25
O.K. Cub .049B Phas.	(AA)	4.95
O.K. Cub .049B Kit	(AA)	3.95
O.K. Cub .074	(AA)	5.95
O.K. Cub .074 Phas.	(AA)	6.75
O.K. Cub .14	(A)	7.95
O.K. Cub .19	(A)	8.95
O.K. Hothead Glo	(B)	10.95
OS 29	(B)	14.95
Sea Fury Outboard .049	(AA)	9.95
Sky Fury .049	(AA)	4.95
Space Bug	(AA)	6.95
Space Bug Jr. .049	(AA)	3.95
Triumph .49 or .51	(C)	18.00
Thermal Hopper (FF)	(AA)	4.95
Veco 29	(B)	14.95
Veco 31	(C)	14.95
Wasp (FF)	(AA)	6.75
Wasp (U-C)	(AA)	6.80
Wen-Mac .049 Phas.	(AA)	6.95

DIESEL ENGINES

McCoy .049	(AA)	5.95
McCoy .09	(A)	7.95
O. K. Cub .075	(AA)	7.50
O. K. Cub .049	(AA)	5.95

IGNITION ENGINES

Dennymite	(C)	6.95
O & R 23 RV Deluxe	(B)	12.95
O & R 29 Rotary	(B)	14.95
O & R 33	(C)	14.95
O & R 60 Luxe	(D)	14.95
Phantom P-30	(B)	13.95
Spitfire	(D)	24.95
Thor	(B)	9.95
Wasp Twin	(D)	29.50

JET ENGINES

Dyna-Jet Redhead	35.00
Mew 307	11.45
Jetex 50	1.95
Jetex 50 Contest Sel.	2.95
Jetex 150	4.95
Jetex Scorpion 600	8.95

ELECTRIC MOTORS

Dynamite	1.98
Speed Reduction Unit	.98
Dumas Electric Drive Unit	4.50
Outboard	2.95
A.H.C.	1.50
Super Dyno	2.50

SPECIAL BONUS OFFERS

ITEMS WORTH OVER $5.00 FREE of extra cost with every GAS ENGINE

(With Diesel or glo engines, all needed items are given.) Other bonus items include: Quality Coil — Everlast Condenser — Hi-Tension Wire — Stranded Ignition Wire — Insulated Coil Holder — Correct Size Prop — Complete Instructions — Battery Box — Slide Switch — Engine Manual — 4 Mounting Bolts — 4 Mounting Nuts — 4 Wiring Lugs — Spark or Glo Plug — No. 70 Oil — Membership in Modelcrafters of America — AHC Guarantee — 128-Page GIANT 2-Color Illustrated Catalog — Free Postage — Packing and Insurance if ordered by mail.

ITEMS WORTH OVER $2.00 FREE of extra charge with GAS PLANES

Correct-Size Rubber Wheels — Giant Construction Manual — Complete Full-Size Plans — Insignia — Membership in Modelcrafters of America — 128-Page GIANT 2-Color Illustrated Catalog — Free Postage — Packing and Insurance if ordered by mail.

(Bonuses on planes selling at over $1.50 only)

ORDER NOW! Get all these AHC "EXTRAS"

MODEL BOATS

Chris-Craft Challenger 33" C-D	8.75
Chris-Craft 26" C-D	6.75
Chris-Craft Express 25" BCD	6.75
Chris-Craft Runabout 25" BCD	6.25
Herco 25" B-C-D	6.25
Owens Yacht 26" B-C-D	6.25
Vineyard 25" BCD	6.25
Buckeye prefab. 17" A-B-C	4.95
Buckeye Jr. 13½" AA-A	3.95
Buckeye Cabin Jr. 13½" AA-A	3.95
Little Buckeye 12" AA	1.95
C.C. Riviera 12" AA	2.95
C.C. Riviera 12½" AA-A	3.50
C.C. Catalina 31¼" A-B-C	11.95
C.C. Outboard Cruiser 18" AA	2.95
C.C. Special 12½" AA-A	2.50
Higgins Speedster 16½" AA-A	4.95
Richardson Sedan 17" AA-A	5.95
Royal Skimmer (Incl. Engine)	10.95
Spitcraft Plastic (Incl. Engine)	14.95
Spitcraft (Plastic)	7.95
Sterling C.C. Buss 19" AA-A	7.95
C.C. Exp. Cruiser 14" AA-A	3.50
Resorter 12" AA	3.25
Sea Maid 12" AA	2.95
Sea Maid 27" A-B	7.95
C.C. 21" Express AA	2.95
C.C. 21" Sportsman AA	2.95
Century Resorter 12" AA	3.25
Century Seamaid 12" AA	2.95
Cruiser 28" Radio Control A-B	9.95
Scientific Sea Hawk 12" AA	2.50
XP-300 Dream Boat 12" AA	1.95
Sea Bird RC 28" AA-C	3.95
Sea Bird 14" AA	1.95

ACCESSORIES

PROPELLERS

Tornado	
6" D 3-4-5-6-7-8 P	.15
6" D 2-3-4-5-6-7-8 P	.15
7" D 2-3-4-6-8-9 P	.20
8" D 3-4-5-6-8 P	.25
9" D 2-3-4-5-6-7 P	.25
10" D 2-3-4-5-6 P	.30
Scamper Plastic 5½" 3p., 6" 4p.	.25;
9" 6p., .45 10" 10p., 11" 8p.	.65
Keysun plastic 5/3, 5½/4, 6/3, 6/4, 6/5—15c; 7/4	.20

Top-Flite—6" in 3,4,5p—20c; 7" in 4,6p; 8" in 3½,6,8,10p; 9" in 4,6,8,12p; 10" in 3½,6,8,12p—25c; 11" in 4,6,8,10, 12p; 12" in 8,8p; 13" 8½p; 14" 6p—30c. AND ALL OTHERS!

METAL GAS TANKS

Dale Stunt Tanks—All Sizes .65
#1—1½x1¼x¾ #4—¾x1¼x¾
#2—2¼x1¼x¾ #6—1½x1¾x1
#3—2¼x1¾x1 #12—¾x1x¾
#15—2¼x1¼x¾ #19—1½x¾x½
#20—2¼x¾x½ .60
Froom: #14—2x1x2 .85
#15—2x1x2¾ .85
#17—⅞x¾x1½ .65
#17A—⅞x¾x⅞ .60
Berkeley: AA—.59; A—.75 B—.75; C—.85; D—.85
Pylon Plastic: Small .75; Medium .95; Large 1.25
Also Acme, Darwin, etc.

SPARK & GLO PLUGS

Champion Glo V, V2, V3	.75
Champion Spark V, V2, V3	.50
McCoy Hot Point	.65
O & R Glo (V, V2 or AA)	.65
O.K. Glo-plug (V2 or V3)	.59
K&B V2, V3 .65—Cox Hotspot	.65
Cox Hotspot	.65
Veco V2 or V3	.65

IGNITION ACCESSORIES

6 ft. Hook-up wire	.25
Austin Booster Plug-in	.30
Midget Switch: slide—.25 Toggle	.50
O & R Snap Pack	.35
Condenser .20; Smith Metal	.35
O & R Instant Clip	.15
O.K. Coil 2.50 Rogers Coil	2.00
Alligator Clips .10—Wilco Coil	1.95
Smith Firecracker Coil	2.75
1½ Volt Battery	.90
Battery Conn. Cord Kit	.40

PROP SPINNERS

1¼"—70c; 1½"—90c; 2"	1.00
Plastic 1¼"—30c; 1½"	.50
Plastic 1⅝", 1¾", 2", 2¼"	.45
Also Wen-Mac, Austin.	

WHEELS

K&B Alum. Hub: 1"—30c; 1½"—40c; 2"—50c; 2½"	.60
Semi Pneumatic (pr) 2"	1.25
2½"—1.40; 3"—1.75	
Sponge Rubber (pr) ⅝"-1" 30c 1⅛"; 1¼" 35c 1⅜" 40c 1½" 45c 1⅝"—65c; 2⅜"	.85
Tail Wheels ½"; ⅝"; 1"	.15
Tracker Pneu. (pr) 1¼" or 1½"	.40
1¾", 2"—50c; 2¼", 2½"—60c 2¾" 1.00; 3" 1.25; 3½" 1.50	
Wheel Collars 5 pr.	.10

MISCELLANEOUS

Glo Engine Handbook	1.00
Spitfire Glo Plug Clip	.15
Batt. Box Pen., Medium, Regular	.40
Brass Tubing 1/16", 3/32", ⅛"	.20
Copper Tubing ⅛" OD, per ft.	.20
Finger Guard .25—Vibratec	3.00
Fuel Pump (pt. or ½ pt.)	.65
Pylon Nylon Pump	.60
Pylon Fuel Bulb Pump 2 oz.	.59
4 oz.	.79
Handy Boy Fuel Dispenser	1.25
Presto Disc Starter	.25
Pylon Engine Starter 1.95;	2.50
Metal Motor Mounts, Sm	.30
Large	.50
Black Neoprene Tubing, per foot	.30
Transparent (reg. or AA) ft.	.15
Spitfire Timer	2.95
Austin Fuel-off Timer	1.95
Hillcrest Fuel Shutoff	1.35
D.E. Shutoff Valve	1.25
No. 70 oil, 3 oz—25c—pint	.60
Plastic Fuselage 19" set of 2	.50
Plug Wrench, 4-way	.25
Plywood (6"x12") 1/16"—25c; ⅛"—30c; ¼"	.35
Silk per yd.: Red, blue, yel., orne.	1.50
Nylon (White or Yellow) yd.	2.25
Socket Plug Wrench, 4-way	.60
Flexible Needle Valves; Cub, Royal Spitfire, Spitzy—49c; Wasp, Baby Spit, Infant, Torp Jr., Torpo 49—39c; Universal Needle Valve (A-B-C engines) 80c; Flexible	.75
Needle Valve Extension flexible	.25
McCoy Speed Needle Valve	.50
E-Z Running Stand	1.75
E-Z Minimount (½A)	1.25
Berkeley (½A) Test Stand	.35
Pilot Heads .05, .10,	.50
Sandpaper Packs .10 &	.20
Glue Gun .50—Plane Kleener	.50
Landing Gear Spade Bolts	.15
Landing Gear J Bolts	.25
Bolts ½", ¾", 1", 1¼", 1½", 2"	12/.20
Grant's Model Airplane Design	3.75
⅝" A.M.A. Decals	.10
Scoremarker Decals (100)	.15
Small Parts Case	.50
Aerogloss Plastic Balsa Tube	.30
4 oz.	.60
Rubbing Compound	.25
Aerogloss Wax	.40
Aerogloss Rubbing Compound	.40

DOPES (Cont'l U.S.A. Only)

We carry all lines of dope and cement: Aerogloss, Comet, Monogram, Testors, etc.

RADIO CONTROL

Super Aerotrol "Ready to Operate" Includes Transmitter, Antenna, Receiver, Escapement, Meter, Tubes. Everything to operate & maintain except batteries	49.95
Aerotrol Manual	1.00
Aerotrol Kit	21.95
Aerotrol Escapement Kit	2.95
Super Aerotrol Receiver Kit	13.95
Super Aerotrol Rec. Assb'ld	22.95
Super Aerotrol Transmitter Kit	19.95
Super Aerotrol Trans. Assb'ld	27.95
Super Aerotrol Escapement	3.95
Babcock Transmitter	39.95
Babcock Receiver	29.95
Citizenship Receiver 24.95 &	29.95
Citizenship Transmitter	34.95
Citizenship Escapement	5.95
Control Master #27 Transmtr.	29.50
Control Master #FS3 Meter	14.95
Control Master #27RH Rec'v'r	19.95
Good Bros. Escapement	13.50
ECC Transmitter (complete)	27.95
ECC Transmitter	18.95
ECC Receiver	18.95
ECC Escapement	5.00
ECC 3A Relay	6.50
Twin Tube Rec'v'r Kit	7.95
Test Meter (Citizenship)	19.95
Motor Control Unit	14.95
Bellcrank & Horn (RC)	.75
U-15 Battery Box	.50
No. 7 Battery Box 1 Cell	.20
No. 7 Battery Box 2 Cell	.40
No. 7 Battery Box 3 Cell	.60
No. 7 Battery Box 4 Cell	.75
3A5 Transmitter Tube	2.25
XFG1 Receiver Tube	3.50
Zero 3 Milliammeter	3.50
Zero 50 Milliammeter	2.75
Whip Antenna	3.00

Also All R.C. Parts and Batteries and anything advertised

U-C ACCESSORIES

Adjustable Push Rod Set	.25
BERKELEY control lines	
.004 or .006x2-35	.35
.006x2-52	.50
.008, .010, .012: 2'-85'	.50
.008, .010, .012, .014 2-70	.65
.012, 0.16: 2-150'	1.00
Stranded .015, .021 55' 1.00; 70' 1.25; 200'	3.50
Berkeley Metal Flight Reel	1.25
Berkeley Metal Handle	1.00
Controliner Flight Reel (with wire) AA—1.95; A-B	2.50
Elevator control horn; Veco .25 &	.30
Elevator hinges 4 for	.10
E-Z Plastic Control Handle	.85
Flex Lead-in Wire AA or AB 3 ft.	.15
Luson Clips A, B, C or D Pr.	.10
PYLON control lines	
.008, .010, .012, .014, .016 dia. 2-52' lines	.60
.010, .012, .014, .016, dia. 2-70' lines	.75
Flexible 2-52' 1.50; 2-70'	1.95
Kenhi Pushrod Keeper	.10
Nylon Lines AA	.25
Pylon Bellcrank 2"—.20; 3"	.25
Pylon Conn. Clips A, B or C 2 for	.15
Pylon Flex Lead-in Wire, 8 Ft.	.25
Pylon Plastic Handle 5"	.85
T. D. Handy Reel & Handle ½A	1.50
T. D. Deluxe Reel & Handle	2.95
Stunt Bellcrank & Elev. Horn	.25
Swivels, small 15c pr.; large	.20
Handy Reel (Consol)	2.95
Handy Safety Thong	.75
U-Reely Contr.—7.50; cable	8.50
Veco Bellcrank 2"—.25; 3"	.30
Wood Control Handle	.25

RACE CARS

Automite with Wen Mac Engine	10.95
Half-pint	2.95
O & R Complete with Engine	19.95
Redzy Complete with Engine	16.95
Jet Race Car with engine	4.75

DECAL BARGAIN $1.00

Just look what you get: 1-3/8" AMA decals, 62 block decals (2 complete sets of numbers plus alphabet and extra letters), 1 set of 4 star & bar 2", 6 picture decals 2" x 4", 3 sheets of solid colors, 1 sheet checkerboard decals, 6 strips of solid color, plus Tips and Hints on use of decals. A REAL BARGAIN . . . WORTH MANY $$$$.

ENGINE TRADE-IN SERVICE

While America's Hobby Center, Inc. does not sell used engines, we have a constant request from schools, clubs and overseas soldiers for second-hand engines for experimental work. If you have a used engine, we will be glad to accept it in trade for any merchandise (motors, planes, boats, accessories, etc.) except Flying Outfits and a few other exceptions, listed in our ads or catalog. Just send in your engine (with your name and address) as the following schedule indicates:

Your old Engine PLUS	$2.75 = $5.00	11.25 = 15.00	Credit towards your Purchase
	7.50 = 10.00	15.00 = 20.00	
	22.50 = 30.00		

We will match any offer in this magazine. Just enclose their ad.

You will receive the usual free premiums, subscriptions, etc.

ENGINE PARTS! EVERY PART for EVERY ENGINE listed on these pages is IN STOCK at America's Hobby Center. Send today for the parts you need to keep your engine in flying condition.

HOW TO ORDER

Send payment in full. No stamps, no C.O.D.'s.

Address your order to us at the branch office nearest to you:

Dept. M-74 156 West 25th St., New York 1, New York
Dept. M-74 55 E. Washington St., Chicago 2, Illinois
Dept. M-74 Room 230, 742 Market St., San Francisco 2, Cal.

WE ALSO SELL TO DEALERS

Did you know that Mod-Ad Agency, Inc., the wholesale affiliate of America's Hobby Center, Inc., is one of the fastest growing "jobbers" in the business?

We know your problems because we have your problems! Write for sample catalog (ready for your imprint) and our famous 9-point program—the reasons why more dealers are doing business with us. Includes our 60-day return privilege, etc. Special data if you are going into business. We ship anywhere in the world.

Send 10¢ for catalog, etc.

Write to

MOD-AD AGENCY, Inc.
156 West 25th Street,
New York 1, N. Y.

2 ENGINE BARGAINS

O. & R. 60 SIDEPORT ENGINE. Discontinued number. Regularly $16.50. Your choice of Ignition or Glo for only $6.95

ANDERSON SPITFIRE CLASS D .646 ENGINE. One of the most powerful engines. Regularly $24.95. Your choice of Ignition for $14.95 or Glo for $15.45.

And with engine, you can buy 6 matching 45c PROPS for $1.00

Both BRAND NEW and FULLY GUARANTEED

SPECIAL SOUVENIR BARGAIN

The manufacturer of a well-known engine, after selling 30,000 at $9.95 has decided to go out of production. We made a special purchase of his remaining 1,000 complete sets of finished and unfinished CASTINGS and PARTS: cylinder, piston, piston pin, connecting rod, needle valve, gas line, timer, crank shaft, crank case, cam, etc., including screws, gaskets, nuts, etc.

You get a complete set, except spark plug and tank. An interesting souvenir of a model engine in the raw for your den or desk.

No. .19 . . . $1.00 per COMPLETE SET

SPECIAL BARGAIN IN PROPELLERS

15 ASSORTED FOR $1.00

We have purchased 50,000 assorted GAS MODEL PROPELLERS from the country's largest prop manufacturer.

They are all PERFECT and range from Champion semi-finished (listing at 5 for $1.00) to finished and lacquered props that sell up to 45c each regularly. Various pitches, in sizes from 7" to 14".

No selections, please, but we will send you a fine assortment of 15 for $1.00, if accompanied by an order for anything advertised in this magazine. MONEY BACK GUARANTEE.

WE DUPLICATE ANY OFFER made by any other advertiser. Attach ANY ad to your order—and take advantage of the AHC "extras."

READ THIS ENTIRE MAGAZINE FROM COVER TO COVER . . . EVERYTHING ADVERTISED CAN BE ORDERED FROM AHC.

Branches Coast-To-Coast

AMERICA'S HOBBY CENTER, Inc.

1931 23rd YEAR 1954

America's Largest Source of Models & Supplies

4 STAR GUARANTEE

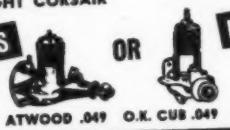
★ To give complete satisfaction or your money refunded
★ To save you money
★ To insure safe delivery anywhere in the world
★ To deliver what we advertise

BIG $10. VALUE

Take your choice of one of these scale U-Control models. Each is completely prefabricated — easy to assemble and fly!

NOW ONLY $7.50

PLUS OR PLUS



ALL ACCESSORIES AND BONUS EXTRAS

COMPLETE FLYING OUTFITS

Worth Twice Our Combination Price!

Man . . . what a buy! Imagine—you get a COMPLETE FLYING OUTFIT at less than half price. That's right, a U-Control PLANE plus your choice of a well-known factory assembled Ignition or Glo ENGINE plus ALL ACCESSORIES plus all the BONUS "extras" listed below. Here's everything you need, complete with easy-to-follow full size plans and instructions, in one purchase that SAVES YOU MANY $ $ $ $. Thousands of hobbyists have already taken advantage of these sensational values. Choose yours NOW!

SPECIAL BONUS OFFER

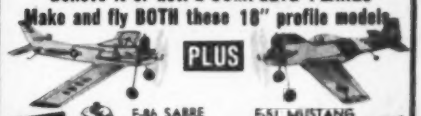
ITEMS WORTH OVER $5.00 **FREE** of extra cost with every complete flying outfit at please and engine.

Correct Size Finished Propeller — Spark or Glo Plug with Gasket— Complete Engine Instructions — Engine Handbook — Metal Fuel Tank and Gas Line — Metal Battery Box — Wilco Quality Coil — 12" Hi-Tension Lead Wire and End Clips — 18" Insulated Ignition Wire — Ignition Slide Switch — Coil Holder and Mount — Everlast Condenser — SAE #70 Oil — 4 Ignition Wiring Lugs — 72 Insignias — Giant Book on Control-Liners — How to Build and Fly Them — Cement — Sandpaper — Metal Bell-crank with Bolt, Nut and Washer — Elevator Horn — Elevator Hinges — Lead-In Wire — Push-Rod Wire — U-Control Handle — 100 ft. U-Control Stainless Steel Wire and Reel — Membership in Modelcrafters of America — 128-page 2-color Catalog — Postage — Packing — Insurance — Ignition parts not needed with glo-engines not included.

NOTE! You may substitute any plane or engine of equal value for any plane or engine included in these offers. Take your choice from listings on opposite page.

ORDER NOW! Get all these AHC "EXTRAS"

Believe it or not! 2 COMPLETE PLANES Make and fly BOTH these 18" profile models



PLUS

BIG $10 OUTFIT FOR ONLY $5.49 With O.K. Cub .049 $6.39

PLUS ACCESSORIES AND BONUS EXTRAS

BIG SAVINGS Deluxe Flying Outfits

Your choice of

Monarch's famous "SPITTIN' IMAGE" 20" wingspan control-line models. Extra deluxe kits PERFECTLY and COMPLETELY PREFABRICATED. Beautiful models you will be proud to fly. A cinch to build and fly!

PLUS

PLUS ACCESSORIES AND BONUS EXTRAS

$15. VALUE FOR ONLY $9.95

SPECIAL!

Chris-Craft

RIVIERA RUNABOUT

Your CHOICE of the SCIENTIFIC 12" model (featuring one-pc. carved balsa hull) or BERKELEY'S 12" model (prefabricated parts) . . . both terrific Speed-boat "thrillers".

BERKELEY RIVIERA with Cub .049 $7.95 with Electric Motor $4.50

SCIENTIFIC RIVIERA with Cub .049 $8.50 with Electric Motor $4.95

PLUS O.K. CUB 049 ENGINE or ELECTRIC MOTOR

PLUS

Every accessory you need, including: all metal parts—flywheel and propeller, drive shaft, etc. PLUS 15 bonus "EXTRAS" at no extra cost!

VISIT OUR FABULOUS "HOBBY CITY" in the heart of New York

Everything under the "modeling sun" . . . under one roof. If it's available anywhere in the world, you'll find it here. Choose from the world's largest stock - including the smallest engine parts.

156 West 25th Street, New York 1, N. Y.

EXPERTS ON HAND AT ALL TIMES . . . THEY'RE HERE TO HELP YOU!

SOLDIERS! SAILORS! MARINES!

Orders placed through us get special attention. We understand your problems and take special care of your orders. No postage or packing charges on orders for over $1.00.

CANADIANS & FOREIGN MODELERS!

You save plenty by ordering from us. We accept your currency at market value. Add 10% for postage and packing (minimum 50¢).

EVERYTHING

anywhere in this magazine can be ordered from AHC

24 HOUR SERVICE

SAVE TIME!

Branch offices, conveniently located coast-to-coast, airmail your orders to our N. Y. headquarters for immediate shipment.

GUARANTEED *Safe Delivery Anywhere in the WORLD*

HOW TO ORDER

Send payment in full. No stamps, no C.O.D.'s. Address your order to your nearest AHC branch office. Include 25¢ extra if order is under $1.00.

Please RUSH me the following: PLEASE PRINT

DEPT. M-74 AMERICA'S HOBBY CENTER INC.

156 West 25th St., New York 1, New York
55 E. Washington Street, Chicago 2, Illinois
Rm. 230, 742 Market St., San Francisco 2, California

Name _____

Street Address _____ Amount Enclosed _____

City _____ Zone _____ State _____

Page	Quantity	Name & Description of Items	Cost Each	Total
			Total	

24 HOUR SERVICE AT ALL TIMES

ONLY 25¢ EACH

WORKBENCH EDITIONS of the famous Winston books (Reg. $1.00 each) for only 25¢ ea.
GLO ENGINE HANDBOOK. Tells all about the theory and operation of glo engines ☐
CONTROL LINERS. How to build and fly them. Covers subject from A to Z ☐
GAS MODEL PLANE CONSTRUCTION. The answers to every problem you will ever meet ☐

DE LUXE HOBBY CATALOGS

25¢ 128 page 2-color 9" x 6" catalog, fully illustrated. Over 10,000 items, including gas, glo, diesel, and jet engines, rubber powered planes, boats, cars, solids of all kinds, tools, engine parts, etc., etc.

10¢ 64 page 2-color 9" x 6" illustrated catalog. Free flight and U-Control planes, engines, accessories, rubber powered planes, solids, boats, cars. Over 5000 items.

FREE Fine jumbo catalog of thousands of hobby items: Plane, boat, car, engines, accessories, solids, gas, rubber, etc., etc.

MAN at Work

(*Continued from page 2*)

little perturbed, but all is forgiven. I agree with Roth that indoor cabin should be scrapped in favor of a paper-covered event for small, simple jobs, but the superlight ships should be retained for those who like them.

"I maintain that a 'mike' job is easier to build and handle than a light paper-covered ship. Mike puts no strain on the framework, but paper is murder when the humidity changes."

And from Fort Worth, Tex., Louis Vargo gives this penetrating analysis of indoors and tosses out additional suggestions:

"Indoor flying enjoyed its period of greatest growth and popularity during the depression days of the thirties. Thus it appears that the generation of 'purists' arose from such practical matters as prohibitive cost of engine and lack of transportation to outdoor flying sites. The point is that the week-end flying session at the school auditorium or park gym of the past included modelers with basically the same general interests as those of the present. These sites are still available. The competition, recognition and comradery all existed to the same degree found in outdoor flying today. What, then, has brought about its decline and talk of abolition?

"In answer to this question, I would present the following factors: (1) A tolerant and often negative attitude toward indoor flying on the part of local and club leadership; (2) A shift in modeling activity toward areas of almost year-round outdoor flying weather; (3) The trend to 'bigger and better' indoor classifications; e.g., the introduction of the Class D stick model and demise of the Class A ROG: (4) The unavailability of high quality materials such as wood and rubber.

"Indoor flying cannot compete with outdoor during the summer flying season which prevails in most sections of the country. But to prevent club and contest activity from becoming seasonal, it is unequaled. Ideally, a mid-winter 'Indoor Nationals' seems to be in order. This, unfortunately, would present an unhappy choice to the versatile modeler who finds himself with but one vacation a year. The question of material availability is largely one of demand. Renewed interest with supplies now obtainable and demand for better quality should remedy this condition.

"It is the third factor over which the Contest Board has control and it is here where I disagree with Mr. Roth. The difficulty in using microfilm covering on indoor models depends almost entirely on the size, shape and strength of the framework to be covered. Initial attempts by the neophyte indoor builder are doomed to failure if he begins with even a 100 sq. in. wing model. What is needed is a class of model where the wing may be covered in one piece on a hoop of film that the beginner can handle. Also, the class should be such that the advantages of super-light construction are minimized. The old Class A satisfies these requirements besides being well-suited to the small and low-ceilinged gym or auditorium. Balsa props and even solid motor sticks can be used without too great a disadvantage. The Class A may be carried in a hat box and withstand a fair amout of rough treatment. They are easy to fly and yet capable of flights of five minutes under ceilings as low as 30 feet.

"Along with these remarks I would like to propose the following indoor rubber-powered classifications:

> Hand-Launched Stick Model—Class A (30 sq. in. wing area or less), paper covered (the beginner's model familiarizing him with basic indoor construction and flying technique);

(*Continued on page 49*)

design detail

Cowling Fasteners

By H. A. Williamson

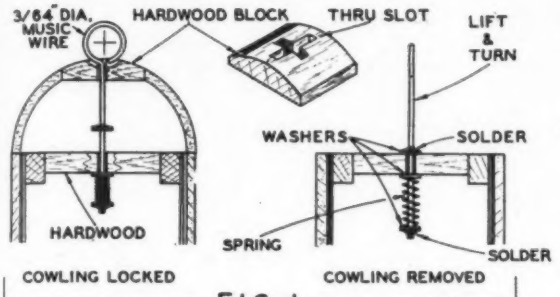


FIG. 1

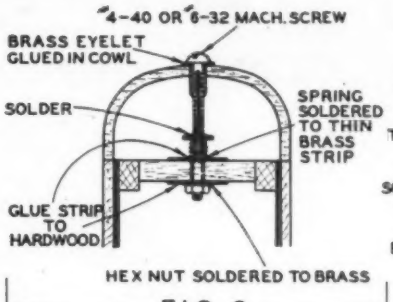


FIG. 2

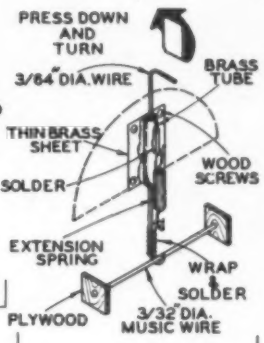


FIG. 3

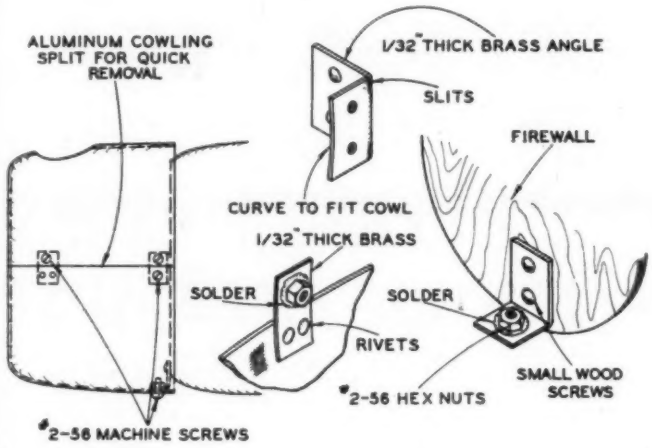


FIG. 4

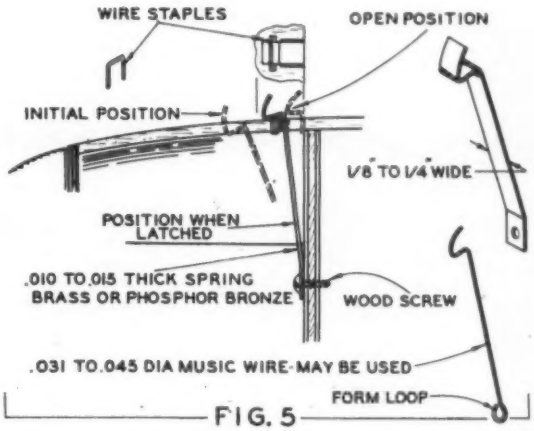


FIG. 5

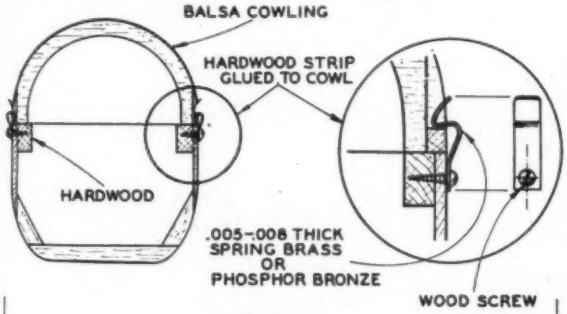


FIG. 6

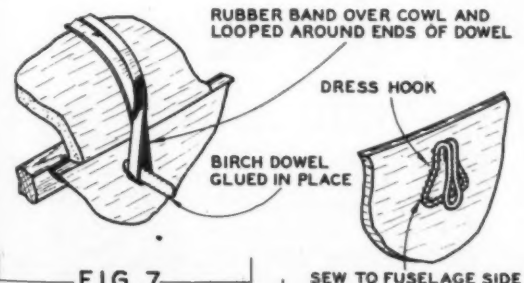


FIG. 7

FIG. 8

▶ The fasteners shown in the sketches are both practical and easy to make. Figs. 1, 2 and 3 show types that are both functional and not unattractive—good for team racers. Fastener in Fig. 1 will look like a loop antenna. Screw type in Fig. 2 is "captive screw type. Spring serves the function of a lockwasher. This type may be used most effectively in stunt and scale ships.

The spring type fastener shown in Fig. 3 was developed by the West Coast team racing gang and is particularly recommended for this type of model, providing quick access to the insides of the ship.

Radial engine type cowls are always a problem. The method illustrated in Fig. 4 is effective and easy to master, and does not require complete removal of the cowl. If a built-up balsa cowl is used instead of aluminum, substitute hard wood blocks for the sheet brass strips and angles.

The spring fasteners shown in Fig. 5 are beginning to show popularity. Ease of fabrication and installation are features. Excellent for team racers and radio jobs

Fig. 6 shows another variation of the fastener shown in Fig. 5. This type will require two or more spring clips at opposite sides of cowl. Some model types may offer special cowling problems that will make this type most easily adapted. Has the advantage of "self-centering" feature.

Last, but not least, the old stand-by rubberbands, as shown in Figs. 7 and 8. For plain, old flying models that are just built for fun, this type is hard to beat. The rubberbands detract from the appearance of the model but they have a sure grip. Birch dowels, wire, dress hooks or almost anything may be used with this type.

Whatever type of fastener is used—positioning pins—either wood dowels or short pieces of wire should always be used to insure that the cowling is always located in the same position.

H. A. WILLIAMSON

Still a pylon, but terrific nose-up thrust effect is eliminated by putting the engine in line with the leading edge. This job has 292 sq. in. area, but real fast, 7%-thick wing section. Timer tank.

Can you Handle that POWER?

By HAL ROTH

It's become a sporting proposition to see who can pack the most power into the smallest plane. High thrust line the latest idea.

Every year the engines get better. And every year the same old free flight designs try hard to control this ever increasing power. Some models make it. Others destroy themselves in terrible crashes trying to reach that happy land of compromise where the climbing adjustments don't interfere with the glide, and the glide settings don't bother the climb.

The basic thrill of free flight models is in the climb—the faster the better. Up the contest ladder have stepped a long procession of free flight winners, each going higher and faster than its predecessor.

Under present rules with the limited motor run, the models must climb extremely high in a short time to make a passable flight. Unfortunately, the faster the models fly, the worse become the power flights. The tiniest maladjustment or design flaw is magnified a hundredfold by any increase in climbing speed.

The balance and wing settings on free flight models must be set for the glide, simply because most of the flight time is totaled there. Difficulty in controlling the climb when the model is rigged with glide settings (say 75 per cent CG and 3° incidence) has driven more than one model builder to stamp collecting.

The trouble is the difference between climbing and gliding speeds. A good flight is made only when a delicate balance between the climb and glide adjustments is struck. A model can be made to climb perfectly every time by sacrificing glide adjustments. But we want the best possible climb *and* glide. We compromise.

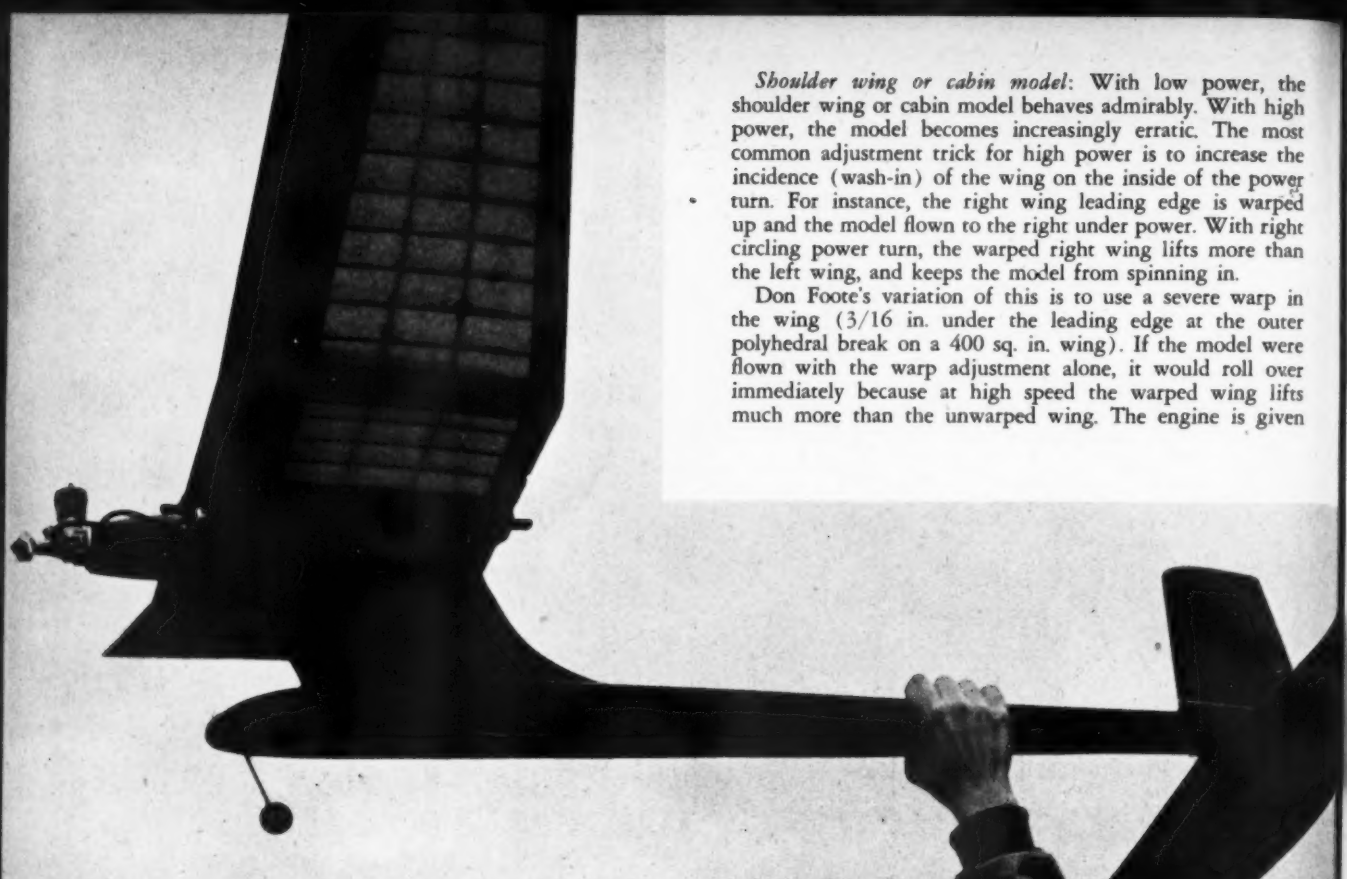
Modern power control tactics have centered about a direct attack on the under-and-over elevation scheme (control the loop by a rigged or corkscrew climb. A more recent idea is to control the loop by mounting the engine high.

All free flight power control can be grouped under (1) shoulder wing or cabin model; (2) pylon model controlled by a variable incidence stabilizer; (3) the underpowered model with a big wing; (4) the ordinary pylon model, and (5) high-engine-pylon model.

For his high-engine-pylon model, Fred Morton changes from an Atwood .049 to .051 in order to fly Classes A and Half-A with the same ship.

Shoulder wing or cabin model: With low power, the shoulder wing or cabin model behaves admirably. With high power, the model becomes increasingly erratic. The most common adjustment trick for high power is to increase the incidence (wash-in) of the wing on the inside of the power turn. For instance, the right wing leading edge is warped up and the model flown to the right under power. With right circling power turn, the warped right wing lifts more than the left wing, and keeps the model from spinning in.

Don Foote's variation of this is to use a severe warp in the wing (3/16 in. under the leading edge at the outer polyhedral break on a 400 sq. in. wing). If the model were flown with the warp adjustment alone, it would roll over immediately because at high speed the warped wing lifts much more than the unwarped wing. The engine is given



Joe Vermoch's FAI design adequately handles the new K & B .15 with a 460 sq. in. wing. Pop-down stab dethermalizer worked by dry ice in pylon.

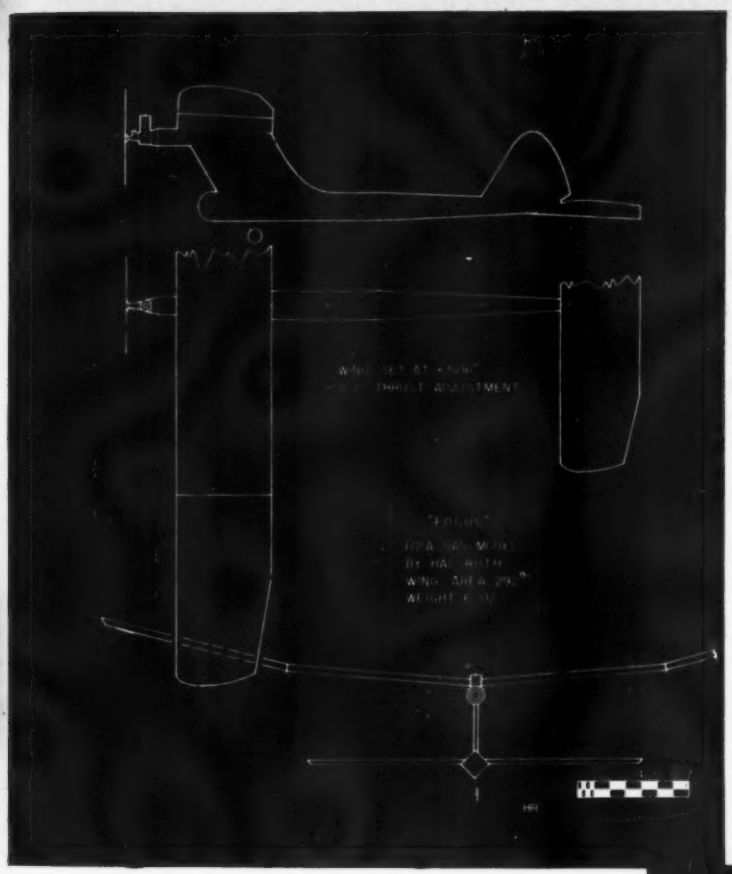
Interesting variation by Fred Morton features a fuselage profile that curves up to wing to eliminate extra structure. Design is a good flier.

considerable side thrust toward the warped wing side. A balance is made between the warped wing and side thrust; when the adjustments are correct, the model has an extremely stable climb and can handle large amounts of power. But because the wing warp is fixed, the engine must be operated at full throttle throughout the testing period. It's an understatement to say this is a hot model to test (out with the steel helmets!)

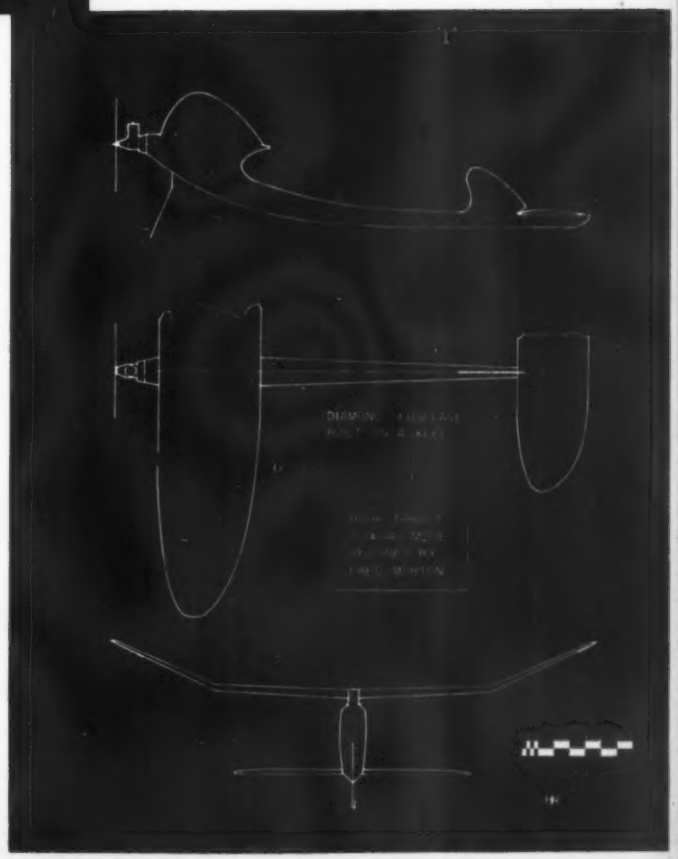
Pylon model controlled by a variable incidence stabilizer: When glow plug engines came into general use in 1948-49, free flight modelers took out all the ignition components and installed the glow plug engines. Naturally the balance point was moved rearward, and to make the models glide without stalling, wing incidence was removed. With less wing incidence, the models glided satisfactorily, the climb was excellent (less looping tendency with less incidence), but there was no pull-out when the engine cut. Too often the pull-out arched into a whistling dive (from 300 or 400 feet up!) and the model was completely destroyed.

Noticing the excellent climb characteristics of the low incidence models, several astute builders came up with a variable incidence stabilizer. This is not as complicated as it sounds. The engine timer is connected to a small tab on the stabilizer. When the engine timer cuts the engine, the "stab tab" is kicked up, effectively increasing the elevation attitude of the model. The device is a gadget, but one Sunday in 1949, we watched a fellow fly a Dooling .61 in a 700 sq. in. model with such an arrangement and his model handled the power perfectly.

The underpowered model with a big wing: As Denny Davis says, "Some build very lightly constructed barn doors and reluctantly hang a sick mill in front and hope to glide



Below—Just like this for the whole engine run! Boston area experimenters developed same answer as far back as 1946.



their way to glory." The emphasis here is on a large model with moderate engine power—say a 750 sq. in. model with a K & B .19. This big job holds down the engine power and has a superior glide with its light wing loading; it often lacks adequate wind penetration on a breezy day and "blows away with no turn." On a calm, hot day it is sometimes difficult to beat. It lacks the spectacular climb of its highpowered brothers, but it often lives to be the oldest man in the family.

The ordinary pylon model: The classical method of controlling engine power is to use a pylon and adjust the model for a circling climb. The high line of resistance caused by the high wing position pulls the model upward—a continuous looping arrangement. But combined with a circle (usually to the right), a pleasant right spiral climb results. Unfortunately, with this arrangement, come the other familiar flight patterns: too much loop and the model goes over the top; too much circle and it spins-in.

The successful pylon model is a tedious compromise, delicately balancing the loop with circle adjustment.

The upward force from the high line of resistance and the circling force both increase when the speed goes up. Their effectiveness *does not necessarily increase together.* After a successful low-powered flight, the pylon model often spins or loops under full steam—even with fantastically precise rudder settings—because either the loop or circling adjustment has gained prominence.

High-engine-pylon model: This fault of the regular pylon model has suggested the advisability of mounting the engine on the line of resistance. By putting the pulling force (the engine) directly ahead of the main drag force (the wing), we might expect straight line forward motion without the upsetting loop spin which plagues (*Continued on page* 38)

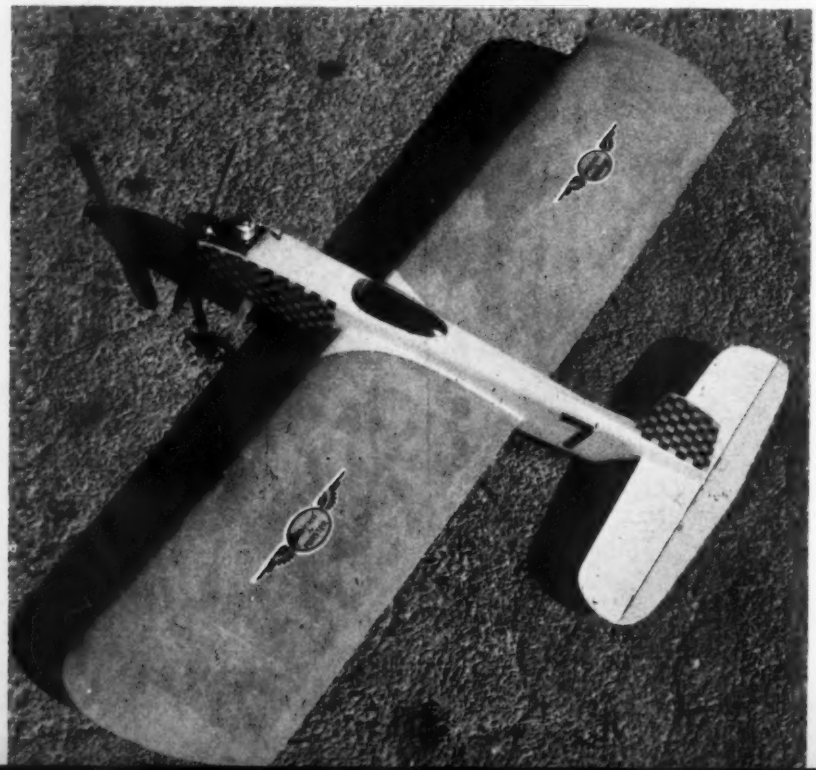
Large wing area permits tight loops and sharp turns. The long nose makes for stability in the air. All four test ships built by the author came in under 5-1/2 ounces. Wings of blue, yellow fuse, stab.

SNIPE

By HAROLD R. NESBITT

Really good stunt jobs for the Half-A engines are rare. And among these jewels this ship is a standout. Not only is it a cinch to build, almost indestructible, but it is a corking windy day design, despite its small size.

Smooth take-offs and landings are among the attributes, normally found only in the big stunters. This job was rigged for clockwise flying but the choice of flying direction rests with the builder.



▶ The Snipe, with its large wing (160 sq. in.) for tight loops and sharp turns, its long nose for stability in the air and the forward position of the landing gear for smooth take-offs and landings, has the features which make a good stunt airplane. For the beginner it is easy to build, almost indestructible and a cinch to fly. For the expert, we think he will have as much fun flying it as we do. There is no need to wait for a calm day to fly the Snipe. Despite its light weight (we have built four and they all weigh under 5-1/2 oz.), it is a fine windy-day airplane.

Construction is quite simple. The wing being the most difficult part, begin by building it first. Take note that one side of the wing is longer than the other. This must be the inboard wing and does away with wing weight and off-set rudder.

Block the leading edge up 1/4 in. and the trailing edge up 1/2 in., pinning both edges to your work bench so no warps develop during construction. Cement ribs, then leading edge sheet covering, and allow to dry. Turn wing over, block up the leading and trailing edges and pin down. Cement leading edge sheet on this side of wing. When dry, the top center section is planked and the wing tips added and the whole wing is then sanded.

You can now install the bellcrank, push rod and lead out wires, and plank bottom of wing center section. Cover wing with lightweight colored Silkspan and the hardest part is now behind you.

Begin the fuselage by cutting out both sides, laying one on the other, and cut out for wing and stab. Cement in the firewall, 1/16 in. reinforcement and gear block and install the fuel tank. Pull the rear together and cement, and when this is dry, slide wing through fuselage and cement.

Now add top and bottom of fuselage and sand well. Cement rudder and stab and you are ready for doping.

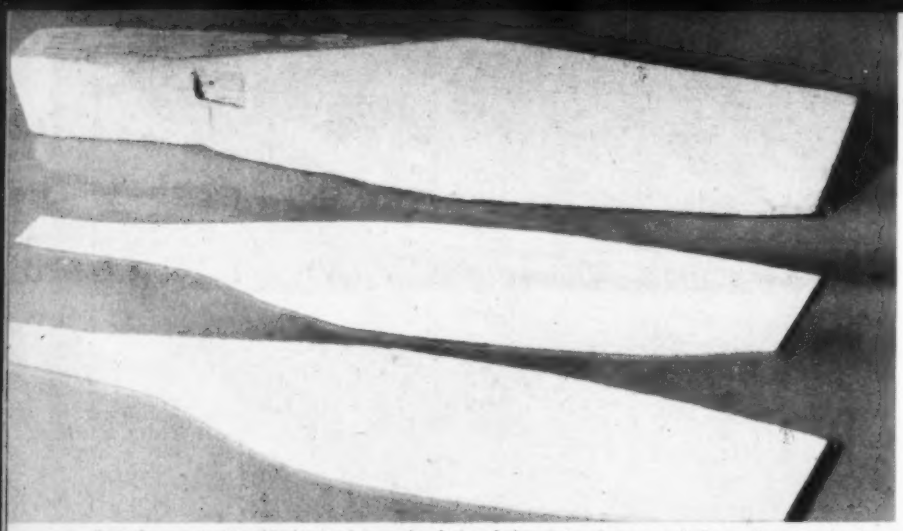
We always thought it was just as easy to put on a good finish as a bad one. Here's how we do it. First clear dope the wing, adding a few drops of the same color as the paper on the wing. Use enough coats so oil from the exhaust will not penetrate. Apply one coat of filler to fuselage and tail section, allow to dry, then (*Continued on page* 45)

FULL SIZE PLANS AVAILABLE. SEE PAGE 44.

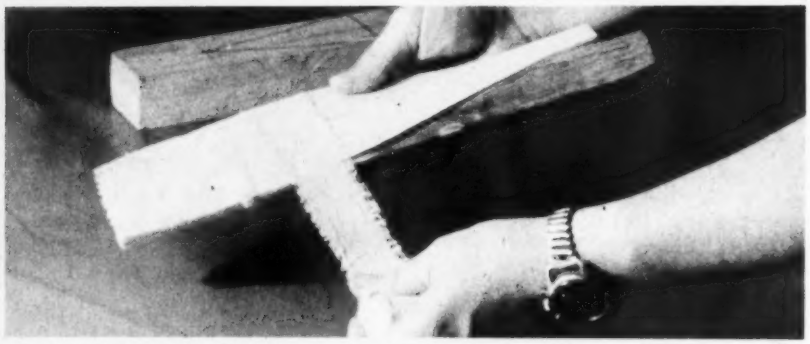
LAMINATED PROPS

by JAMES F. TANGNEY

Well known Wakefielder develops unique method for mass producing quickly interchangeable propeller blades. Why carve?



Form for constructing blades (top) is made of pine; below it two layers ready for preliminary shaping. Note depression and guide hole on form, used for positioning hinge hole. Layers are sheet balsa.



The thinner layer is soaked in hot water, then bound to the form with gauze. Small props may be made over a machine-cut hobby shop propeller, using it as form. Balsa form okay one operation.

After coating the thinner layer with resin glue (like Weldwood), a layer of tissue is worked smoothly into place. When finished, prop consists of two layers of balsa and two layers of tissue paper.

After the first layer of paper has been glued over the first layer of wood, it then is coated with the resin glue preparatory to strapping in place the second, or thicker, layer of the balsa wood.

▶ Suppose you accidentally break a prop at home. Do you cancel flying for the day? Do you go to the contest with an unadjusted model? Not at all! You simply remove the broken blade, pull another from the model box, and in no time the prop is ready to go again. That broken blade can be fixed when you get back from flying. This is just one illustration of how useful the idea of formed prop blades has turned out to be.

The first step in making such a prop is to make a form for constructing the blades. It may be carved out of pine if you plan to use it for several props; otherwise, it may be carved from balsa. It is blanked out like any prop block but only the top face is carved. A slight amount of camber is put into this face. Remember when carving that the top surface of the form will correspond to the rear surface of the prop. The form need not be particularly smooth as long as there are no humps or gouges. We use a wood file to finish the form, holding it in a vise for this operation. If you want to make a small prop you can even use a machine-cut prop with the upper face slightly cambered for a form. The form should be laid out so it has the desired pitch. If the diameter and blade widths are somewhat larger than necessary, it does not matter. The same form may be used for props of various diameters and blade shapes, but the pitch will always be the same.

The chief material for the blades is sheet balsa. You will need some hard 1/32 in. sheet and some soft 1/16 in. sheet (for props 16 in. or smaller) or 3/32 in. sheet (for larger props). Be sure it is quite soft as harder sheet used for the heavier layer of the blade will

Binding the glued layers against the form. For tough construction of props, be they one, two, three, even four blades, this new idea is a dilly.

Removing the formed blade. At this stage it is lacking only the final paper layer and the finishing. Note the guide hole near the right thumb.

Sanding the blade to proper thickness and cross-section. Color line, near tip, shows first tissue layer. Blade has been cut to proper outline.

Covering upper surface of sanded blade, using form for backing. Slitting the paper at ends of blade avoids wrinkles. Prop details shown below.

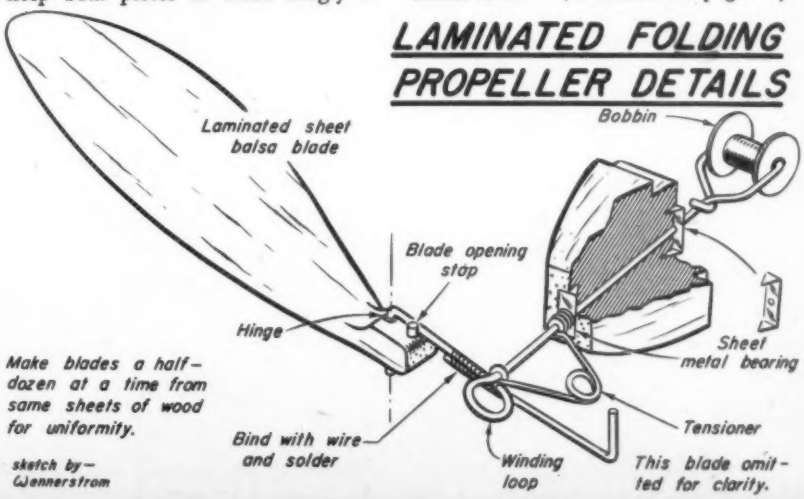
be too difficult to bend and soft wood will give adequate strength. Make a paper pattern which roughly corresponds to the blade shape you want. It need not be too accurate, but it must not be wider than the face of the form and it should allow a little extra length at the hub to provide a handle while finishing the blade. The more the pattern narrows at the hub the easier it will be to bend the blades.

Cut a piece of each size balsa to shape and soak in hot water for a few minutes. Remove them, dry lightly with a towel, and place them on the form, with the thinner one on the bottom. Now, starting from the tip, wind 1 in. gauze bandage around the form, pressing the balsa into place on the form as you do so. If your pattern was too wide and the blades extend beyond the form, they will buckle and have too much camber. Now is the time to trim them. When the wrapping is completed, place the form in a warm place and allow to dry thoroughly.

After drying, the gauze is removed. You now have two twisted pieces of balsa which faintly resemble prop blades. Mix some resin cement, such as Weldwood. A piece of Silkspan is cut to the shape of the blade layers. The 1/32 in. layer is coated with cement on the top side. Don't use too much or it will ooze out at the edges and stick to the form. A good preventive measure is to rub the form with waxed paper to prevent sticking, just in case a little cement does get in the wrong place.

The cemented layer is now placed on the form. The paper is laid over this and pressed into place. Work out any wrinkles with your fingers. Put a coat of cement on the paper and press the thicker layer into place. Again the gauze is wrapped around to hold the pieces together. Be sure it is tight enough to keep both pieces of wood snugly together. Let everything dry for about 24 hours. Then remove the bandage and your blade is ready for finishing.

The blade is now cut to the exact shape desired, except for the hub end, which is best left longer than necessary to provide a handle while finishing the blade. Sand the reverse side of the blade first. This will be easy as it amounts to sanding a twisted piece of sheet balsa. After that the top is sanded to give the blade the proper thickness and cross-section. We have found that when these blades break (*Continued on page* 40)



STRATOHAWK

By FRANK HEEB

This Nationals-winning limited class rubber-powered model is eminently suited to anyone who has yet to build this type of ship.

Frank and his 1953 Nats winner. Larger version with diamond fuselage won a first for him in the Wakefield class at the 1952 Nats. Small ship capable three minutes dead air on a minute motor run.

Model aviation's oldest existent trophy, the Mulvihill, left, won by this ship at '53 Nats.

Built in week before Nats, original had three-ounce air frame weight, plus two ounces rubber.

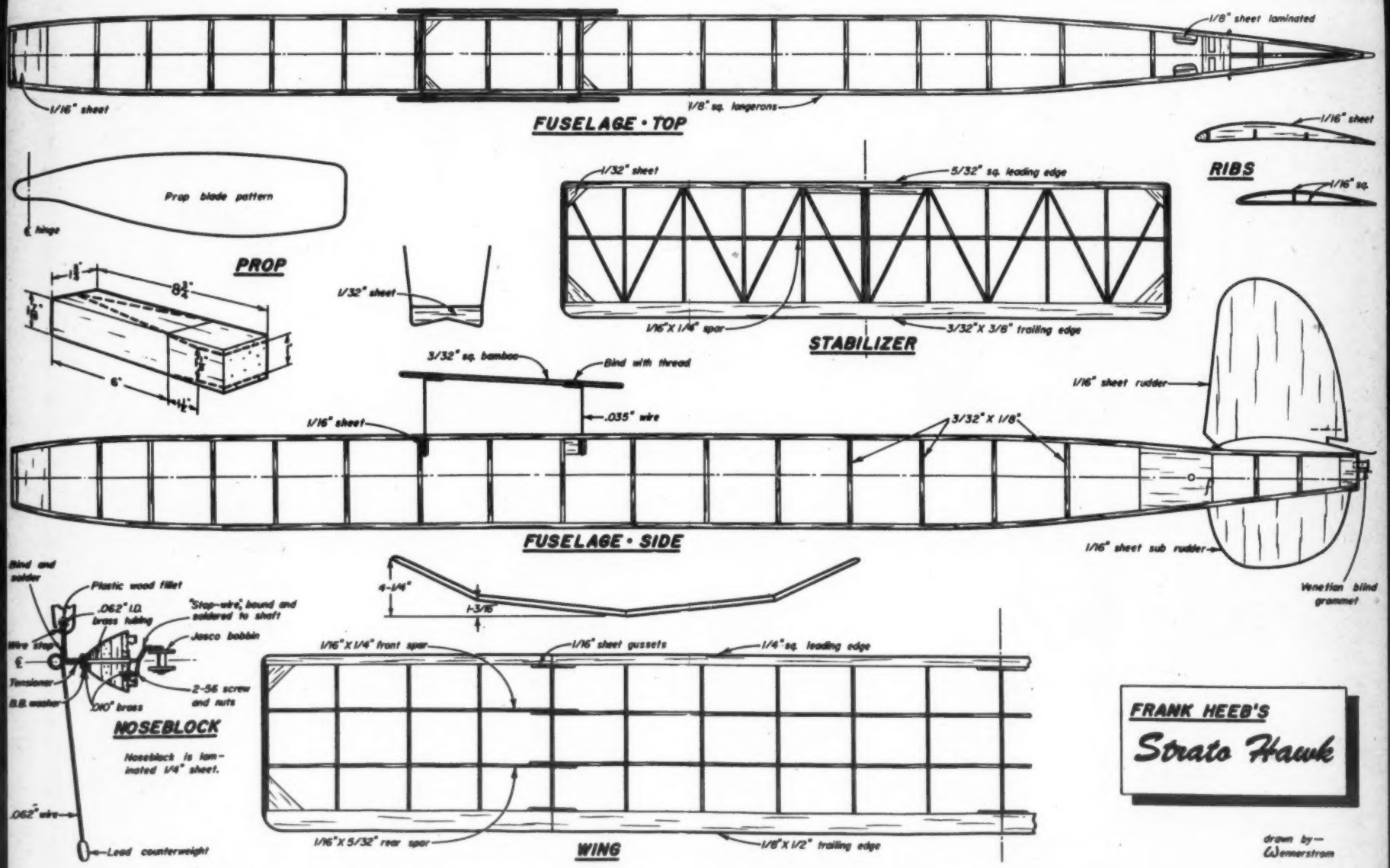
Below—Frank, right, and friend demonstrate winding technique, with a large winder and strong hook that goes through hole bored through shaft of hand drill. Model named after club, Springfield, Ohio.

▼

The Stratohawk is the present result of a series of seven models of similar size and configuration and was designed specifically for the limited rubber class. This model won first at the 1953 Nats with a total time of 13-1/2 minutes. The 1952 model which won first at Los Alamitos was of Wakefield size and had a diamond fuselage, these being the only differences between the models. The model is named after my club, the Springfield, Ohio, Stratohawks. No fabulous performance claims can be made, but the model is capable of doing three minutes in dead air with a one minute prop run.

The original has an airframe weight of 3 oz. plus 2 oz. of rubber and was built in the week preceding the Nationals. Through lack of time, no attempt was made to build a super-light airplane, but it is believed that an airframe weight of 2-1/2 oz. could easily be achieved by proper selection of wood and skimping here and there on wood size. This would give a motor weight 50 per cent of total weight, a good figure anywhere. It is my belief that no matter how heavy the airframe may turn out, only enough rubber should be used to make the total weight requirement. It is better to have to live with a light under-powered airplane with a good glide than a heavy one with a lot of rubber and a high sinking speed.

A note about the design theory: The wing is raised above the fuselage for three reasons. First, the parasole effect is an aid to stability, especially under high power; secondly, the wing is above the fuselage turbulence and the lift of the center section is not lost; and thirdly, the trapeze provides a more stable wing mount than a pylon or rubberbands around the fuselage. Of course, this high wing does have the drawback of required additional downthrust, but no harmful results of this have been noted. The large diameter prop with generous area and high pitch is utilized to get a fairly long motor run out of a long motor with (*Continued on page* 44)



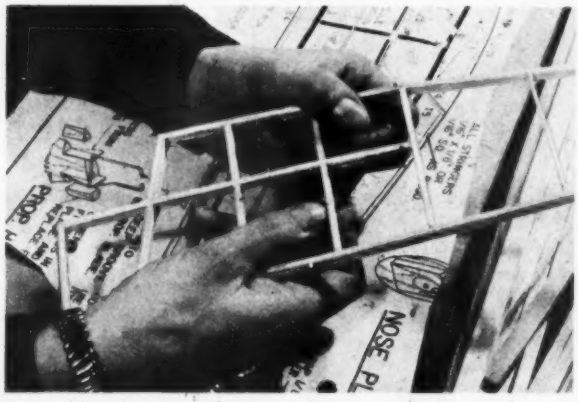
FULL SIZE PLANS AVAILABLE. SEE PAGE 44.

HOW to make a built-up fuselage

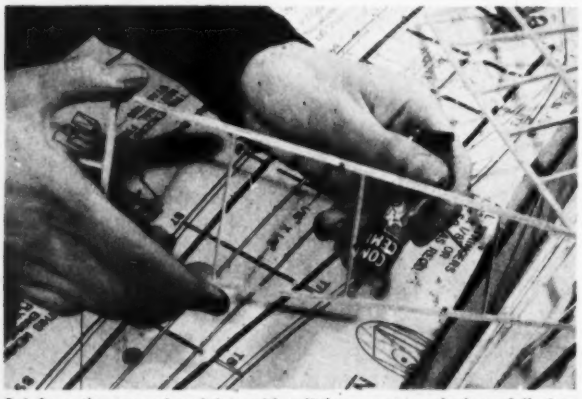
A MAN How-To-Do-It

Cover plan with wax paper, pin down longerons. Do not push pins through the wood. Cut out cross pieces in pairs for accuracy, save time.

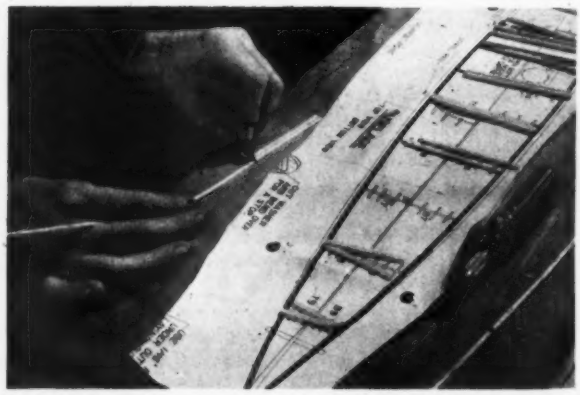
Put cement on cross piece ends; touch ends to longerons, an end at a time. Put on more cement (sparingly!), then work the pieces into position.



Removed from board, finished frames (let dry overnight) separated with thin razor blade. If cement isn't really dry, let frames stand while.

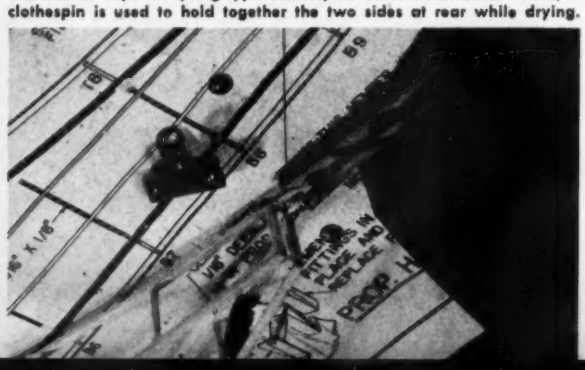


Reinforce the cross piece joints with a little cement, worked carefully into the corners. Good workmanship makes the framework withstand abuse.

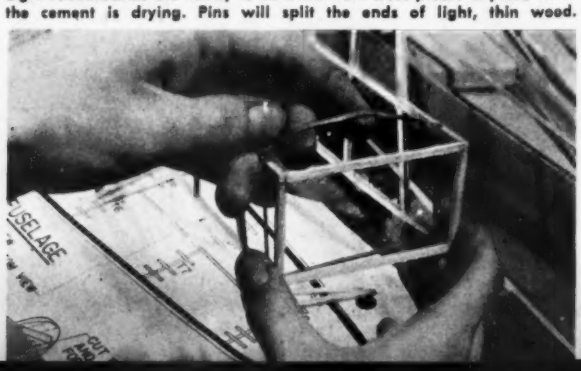


The cross pieces for top and bottom are cut out in pairs for accuracy and are laid on the plan in their respective places to avoid confusion.

The use of clips or spring-type clothespins eases construction. Here, a clothespin is used to hold together the two sides at rear while drying.



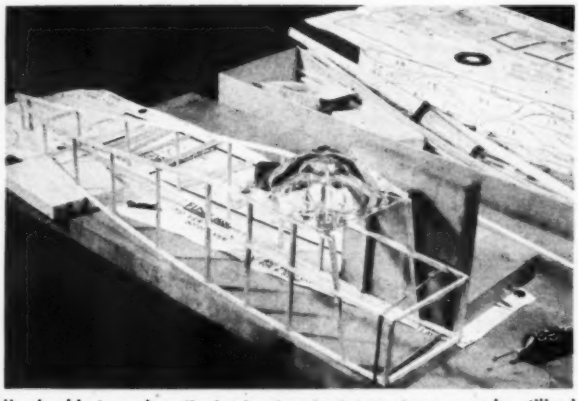
Light rubberbands are handy to hold the front cross pieces in place while the cement is drying. Pins will split the ends of light, thin wood.



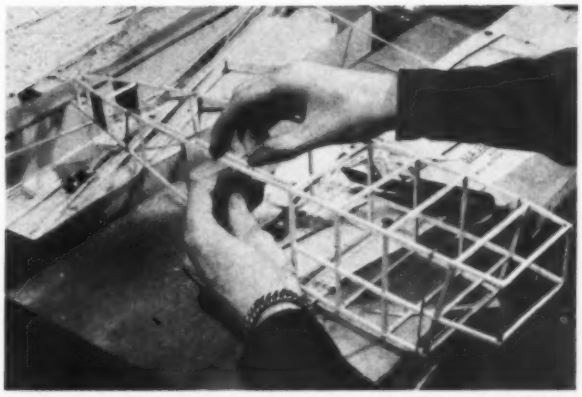
by ART SILBERBERG

Prefabrication and plastics are essential parts of the hobby, but so is knowledge of building airplanes. To assist younger readers, MAN presents the first of a picture series showing construction of typical kit, a Fairchild.

While the first few cross pieces that join sides dry, aline fuselage for accuracy. Some prefer to join widest pieces first, then nose and tail.



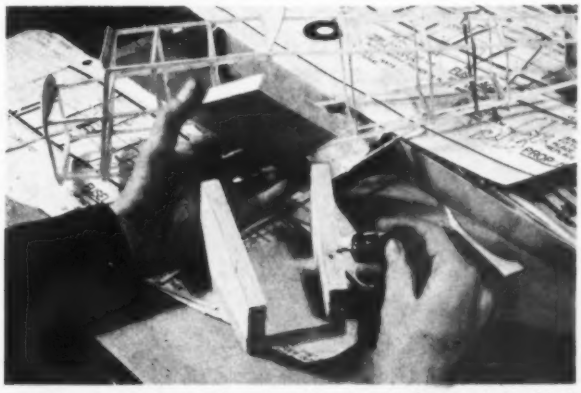
Handy objects, such as the bookend and ash tray shown, may be utilized to keep frame alined when attaching more pieces. Pins may be used here.



Inserting cross pieces between cabin, tail, stretch sides apart slightly to work pieces into position. Cement ends of cross pieces as before.

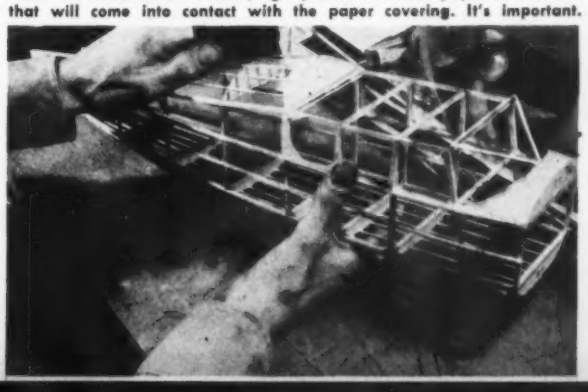
Formers for stringers, etc., made true by sliding on flat piece of sandpaper. If edge is to be beveled, simply slant the former when sanding.

Medium sandpaper first, then fine sandpaper to get smooth finish. The appearance of your ship depends upon the care taken sanding all surfaces.



The scale type nose was built up from these four blocks; actual nose block spot-cemented temporarily during the carving and sanding operation.

When the construction is done, lightly sand with fine paper all surfaces that will come into contact with the paper covering. It's important.



Fuselage is one piece of sheet balsa, stabilizer sliding into slot. Wing halves butt against triangle stock, wide edge down, for automatic dihedral.

Wild Hair JOE

By KEN WILLARD

An evening's time and work will repay you one hundredfold in fun unlimited. Make this wee .02 to .039 free flight from full size plans, opposite.

Are you tired of technical tripe? Fed up with frightful free flights? Would you like to go out to your workshop, toss some balsa together, and in a couple of hours have a little job ready to fly that will have your friends asking for the plans so they can join the fun? Then Wild Hair Joe is just the model for you.

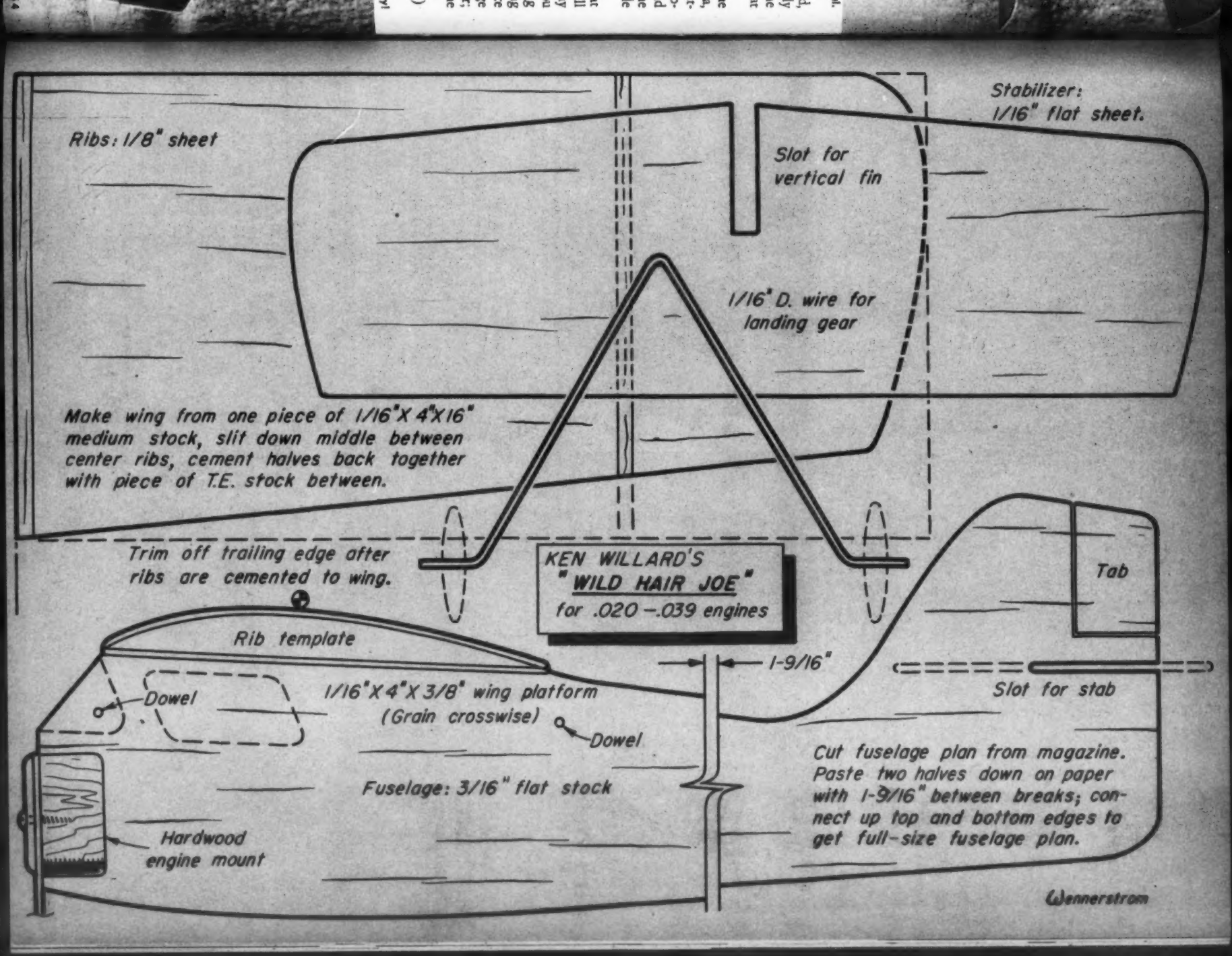
Mind you, it's a small job (the plans are full size) and you'll have to go easy on the tab settings, because with all the power it has for its size, especially with an .035 or .039, a little too much tab in either direction will spin it in; but, if you have a good straight piece of balsa for the fuselage, you probably won't need any tab at all. Properly adjusted, Wild Hair Joe goes spiraling up in a left turn, and really makes time. In fact, that's where the name comes from; the first time I flew the model, a friend of mine remarked, "That little Joe curls up there like a wild hair!"

Construction is so simple that you can build it in one evening. The profile fuselage is cut from one piece of balsa, with a slot cut in the fin where the stab fits. The wing platform cemented on the top of the body automatically establishes the proper angle between the stab and the wing, and the only thing you want to watch pretty closely is that the hardwood disc for the engine mount doesn't give any side thrust when it is cemented in place.

Make the wing from one piece of 1/16 x 4 x 16 on a flat surface, without tapering the trailing edge until after all four ribs are cemented in place; then, when you cut away the trailing edge from the center ribs out to the tips, you automatically provide washout, which improves the flying characteristics. The dihedral is also automatic; slit the wing apart between the two ribs at the center and insert a piece of trailing edge stock between the ribs, with the thick edge on the bottom. Then cement the two halves back together; this gives just the right dihedral. Trim off the top of the trailing edge stock to conform with the wing.

The landing gear is bent from (*Continued on page* 46)

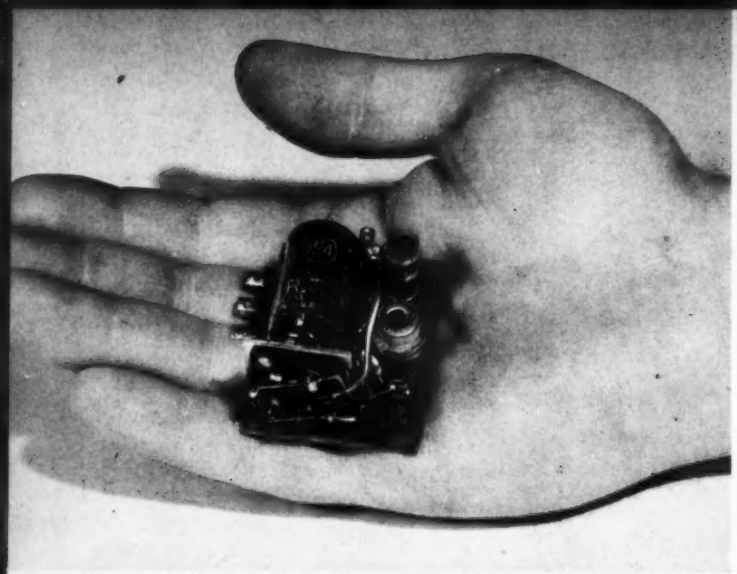
When the sheet balsa is tapered after construction, it provides automatic washout for extra stability. Adjustments by tab only but do go easy!


Ribs: 1/8" sheet
Slot for vertical fin
Stabilizer: 1/16" flat sheet.
1/16" D. wire for landing gear
Make wing from one piece of 1/16"X 4"X16" medium stock, slit down middle between center ribs, cement halves back together with piece of T.E. stock between.
Trim off trailing edge after ribs are cemented to wing.
KEN WILLARD'S
"WILD HAIR JOE"
for .020 -.039 engines
Tab
Rib template
1-9/16"
Slot for stab
Dowel
1/16"X 4"X 3/8" wing platform
(Grain crosswise)
Dowel
Fuselage: 3/16" flat stock
Cut fuselage plan from magazine. Paste two halves down on paper with 1-9/16" between breaks; connect up top and bottom edges to get full-size fuselage plan.
Hardwood engine mount
Wennerstrom

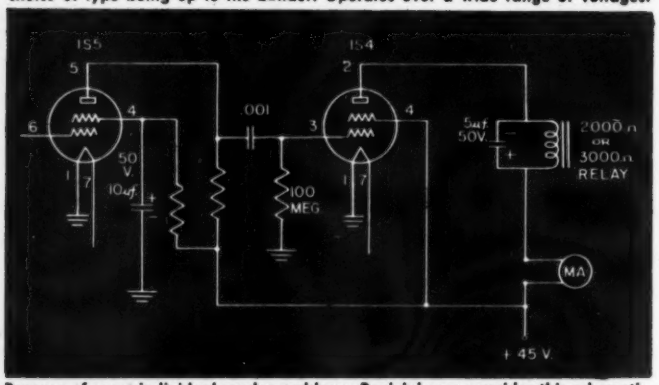
RADIO CONTROL NEWS

by E. J. LORENZ

New receivers, escapements, gadgets and gismos pop up like Spring flowers, almost as fast, you might say, as the new clubs that are being organized.



The ECE receiver, as tested in the copy. The relay is mounted separately, the choice of type being up to the builder. Operates over a wide range of voltages.



Because of some individual reader problems, Paul Johnson provides this schematic to illustrate further modification and improvement in his three-tube receiver.

Removable receiver installation worked out by Bob Palmer for plane kit design. The escapement also is removable for inspection.

S.O. Valencia, in Carcar, Cebu, modified Comet Clipper. That's Junior hanging onto the tail.

Below—Great Lakes Trophy, presented by the Radio Control Club of Detroit. It is perpetual.

▶ This month we are greatly enthused over two new items that have appeared on the RC market, ones that we think really merit your attention.

The first is a completely new receiver by Electronic Consultant Engineers of Albuquerque, N. M. This one-ounce receiver, using a 3S4 tube, measures 1 x 1-9/16 x 2 in. and will operate on a plate voltage of 67-1/2 volts down to 22-1/2 volts. Filament voltage is 1-1/2 volts, although the receiver will function when this voltage drops as low as .9 volts. As can be seen, the ECE model 2A receiver operates over a phenomenal range of battery voltages. Although we just received our first receiver and have not had time to give it all the tests we'd like, here are the results of our first few tests.

The receiver was removed from the packing box and connected according to instructions. *No* adjustments were made and the unit functioned perfectly. Next, we tried a distance check across our front yard. Using a 15 in. antenna on the receiver and about .2 watts of RF power, the receiver worked fine at 100 ft. range. The next check, with the assistance of Mr. Herman Rau, was carried out 500 ft. parallel to a main highway (Rt. 9, Hyde Park, N. Y.). To make this test a "toughie" we placed the receiver atop a 9 in. high box which was on the ground. The 15 in. antenna was strung out at a 45° angle and away Mr. Rau went. With 45 volts on the plate and using an 8,000 ohm Sigma 4F relay, the idling current was 2.25 ma. Twenty-five feet away the current dropped to .45 ma, with approximately 3/4 watts RF sent into the 9 ft. vertical transmitter antenna. At a distance of 300 ft. the drop went to .5 ma. At 700 ft. it was .6 ma and at 1/4 mile, the drop was to. 85 ma. At three-eighths of a mile, with the drop to 1.2 ma, the tests were concluded for lack of communication between the transmitter and receiver. *No* adjustment was made on this receiver from the time it was removed from the box up through our latest tests. In the last test, the receiver was on the ground and the transmitter hidden at times behind trees. We had a transmitted power of only 3/4 watts, which again proves our contention that a five-watt transmitter is not always the answer to "lost control." All in all, we believe this to be one of the best hard-tube receivers we've ever seen. It is compact and neat and has but one adjustment, (*Continued on page* 38)

Even ROW's go higher than land plane of ten years ago. Since America favors high rpm, small props, author suggests wider use of racing engines.

Woody Blanchard flips over the Cub .14 in the original FAIsen (MAN, Feb., '53). High thrust of modern engines more than doubled wing areas.

TUNING

The Free Flight ENGINE

By E. C. MARTIN

In even this event a fast-stepping engine is the pay-off. But when it comes to sport, the ambitious tinkerer can work out lots of razzle dazzle stuff.

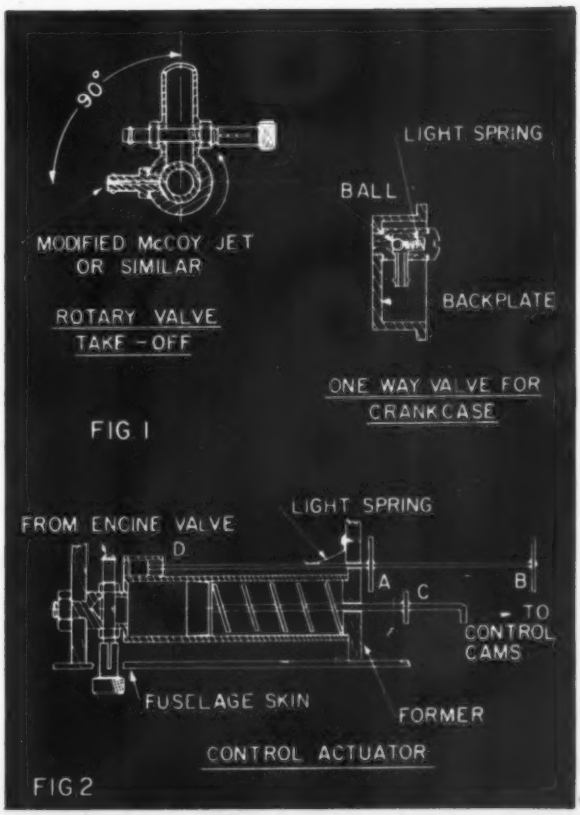
There are at least two schools of thought as to which type of engine will get upstairs fastest, and generally speaking, one is more popular in this country, while the other is more common in Europe. The reasons largely center on the types of engine available in the two countries. Over here, the high revving, low torque glow plug engine is predominant, and competition free flighters invariably use small diameter, narrow-bladed props which permit rpm in excess of 15,000. In Europe the Diesel rules the roost, and owing to its relatively high torque and low peak bhp revolutions, the dieseleer favors large diameter wide-bladed props that turn slowly and dig deeply.

If you visualize the flight paths of the two models as being long cylinders of air having diameters equal to the prop diameters, it is evident that in traveling an equal distance the big diameter low revving job displaces a greater cross-sectional area of air. However, as the path of each individual blade tip resembles a helix, it is not necessarily true that the the large prop displaces a greater weight of air.

Thrust is equal to the weight of air displaced in a given time, and the question is whether the principle of displacing a small cylinder of air quickly is better than shoveling a large cylinder of air slowly. Theoretically, it makes no difference, so let us view the question from the standpoint of the engine.

We know that an engine which produces its peak power at 15,000 rpm will give more bhp than an engine of similar displacement which peaks at 12,000 rpm. We also know that the first engine when loaded down to 12,000 rpm will usually give less bhp than the second (*Continued on page* 46)

Good hand-starting is always rated very highly by sport free flighter.

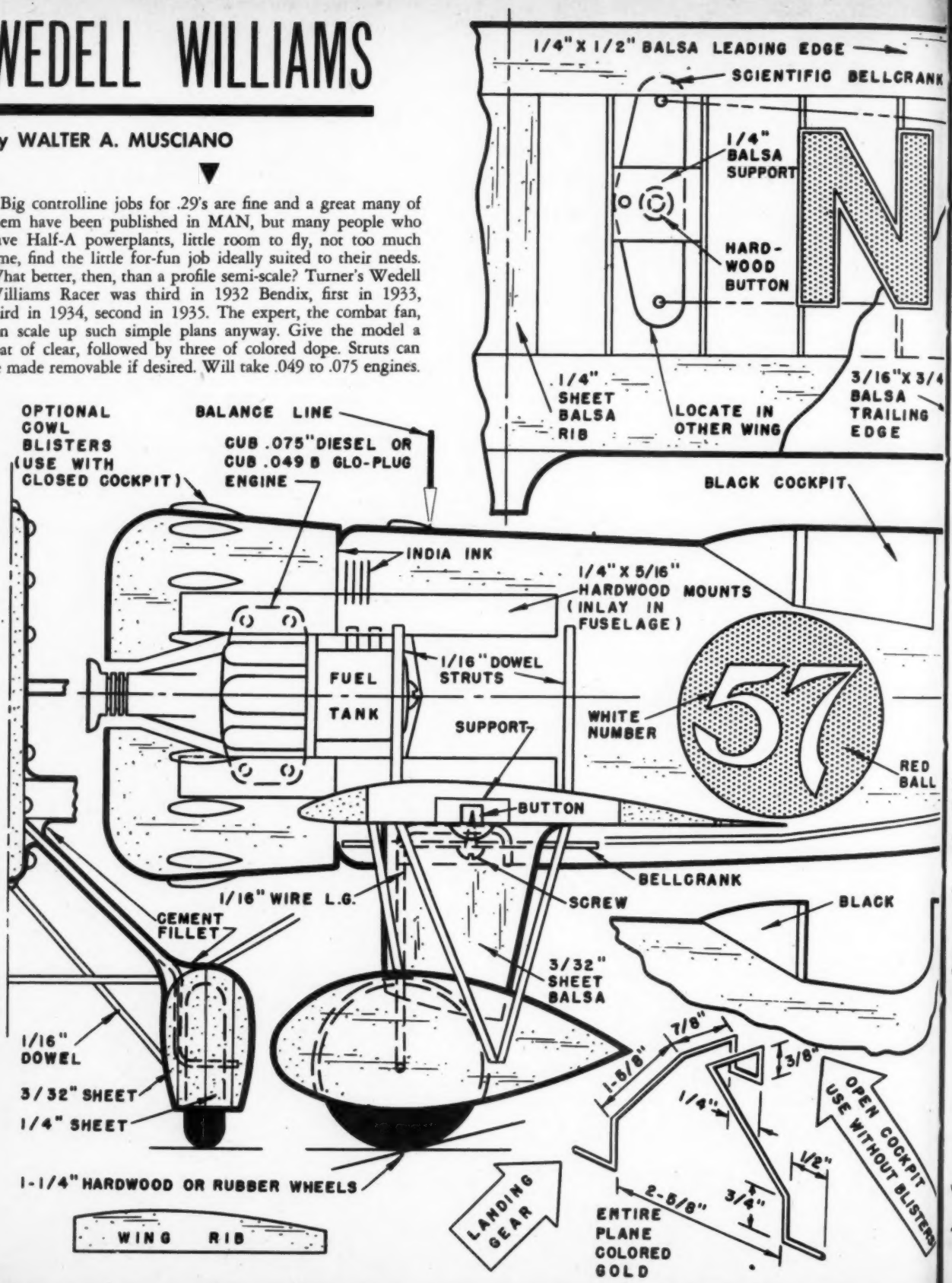


WEDELL WILLIAMS

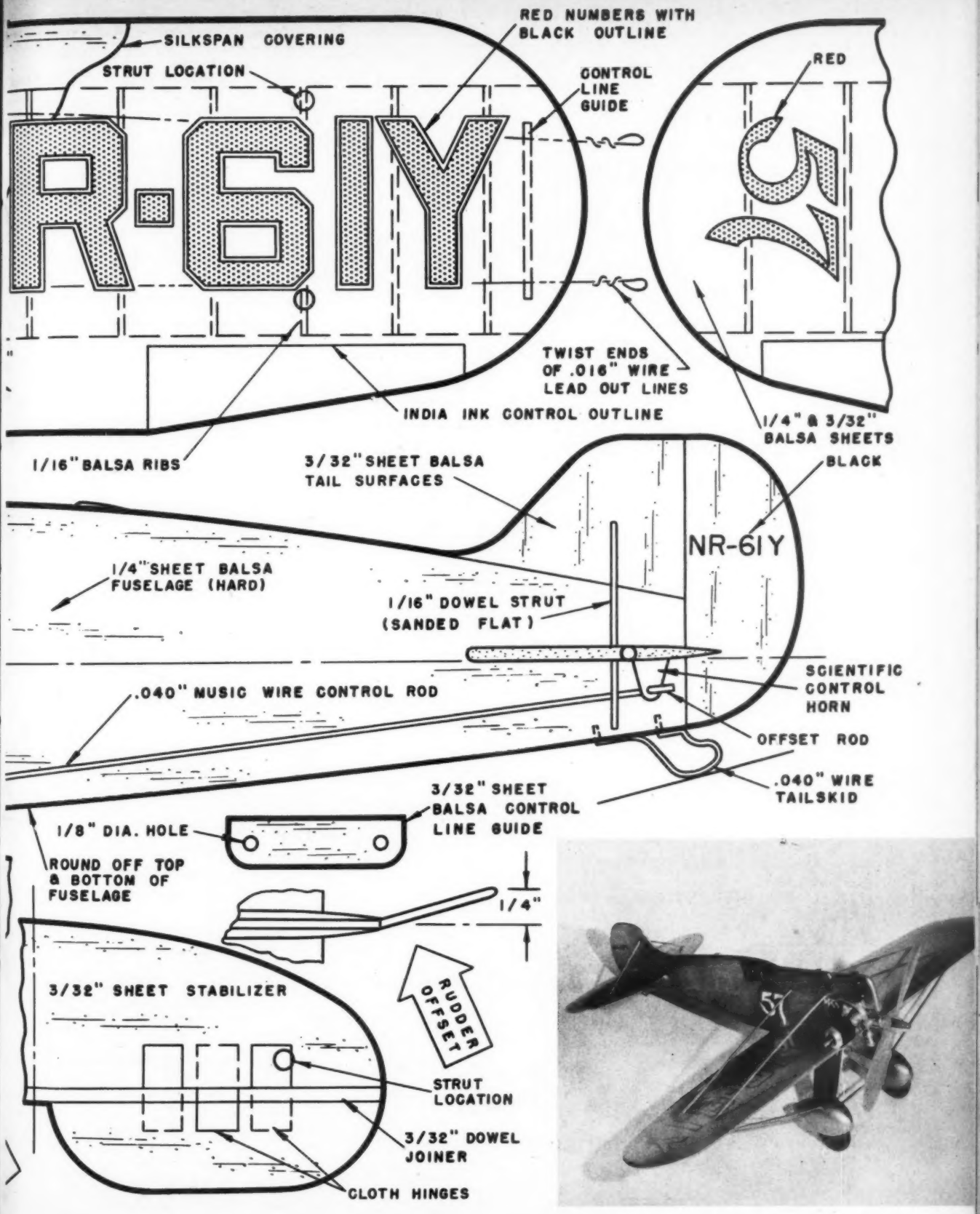
By WALTER A. MUSCIANO

▼

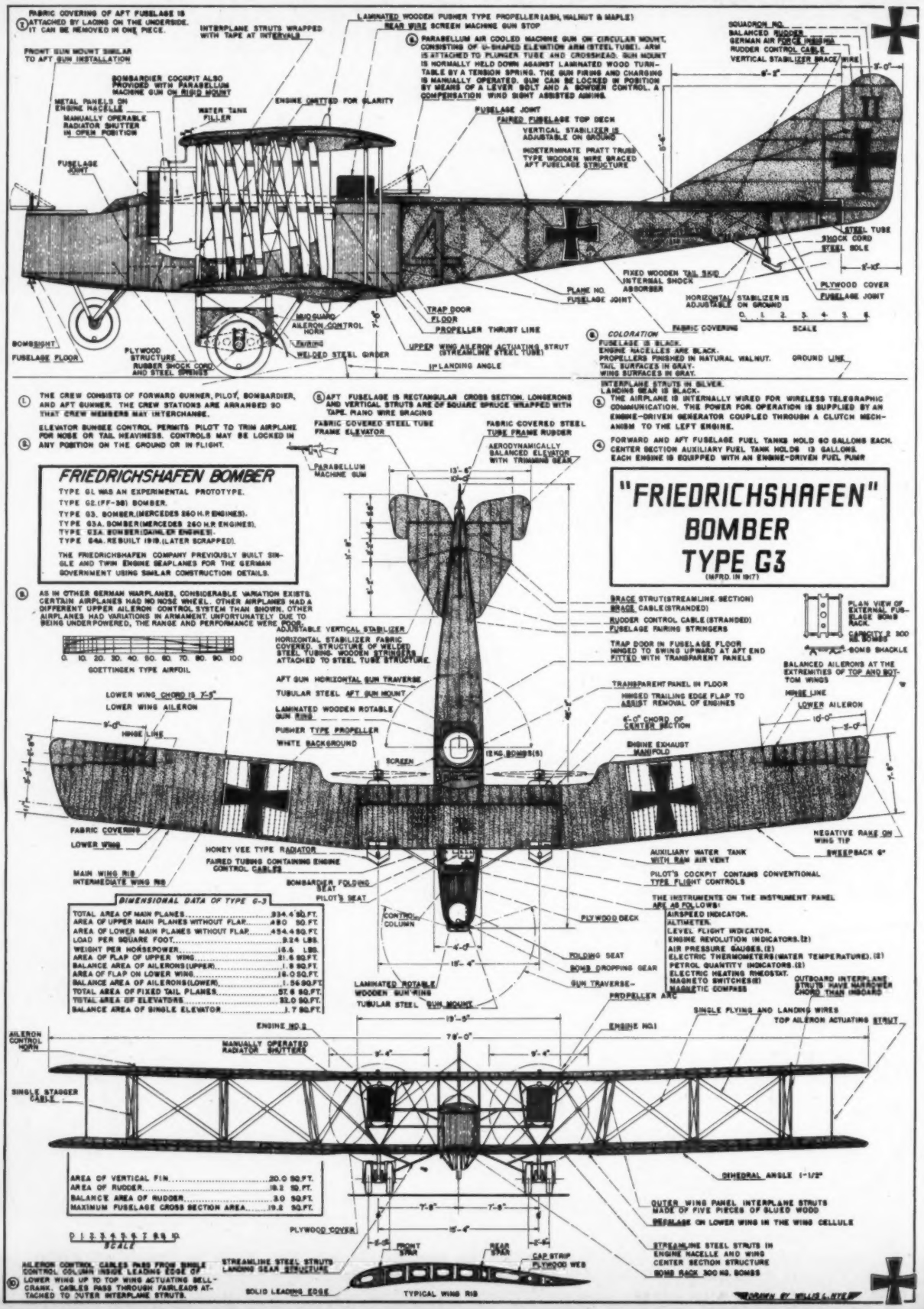
▸ Big controlline jobs for .29's are fine and a great many of them have been published in MAN, but many people who have Half-A powerplants, little room to fly, not too much time, find the little for-fun job ideally suited to their needs. What better, then, than a profile semi-scale? Turner's Wedell Williams Racer was third in 1932 Bendix, first in 1933, third in 1934, second in 1935. The expert, the combat fan, can scale up such simple plans anyway. Give the model a coat of clear, followed by three of colored dope. Struts can be made removable if desired. Will take .049 to .075 engines.

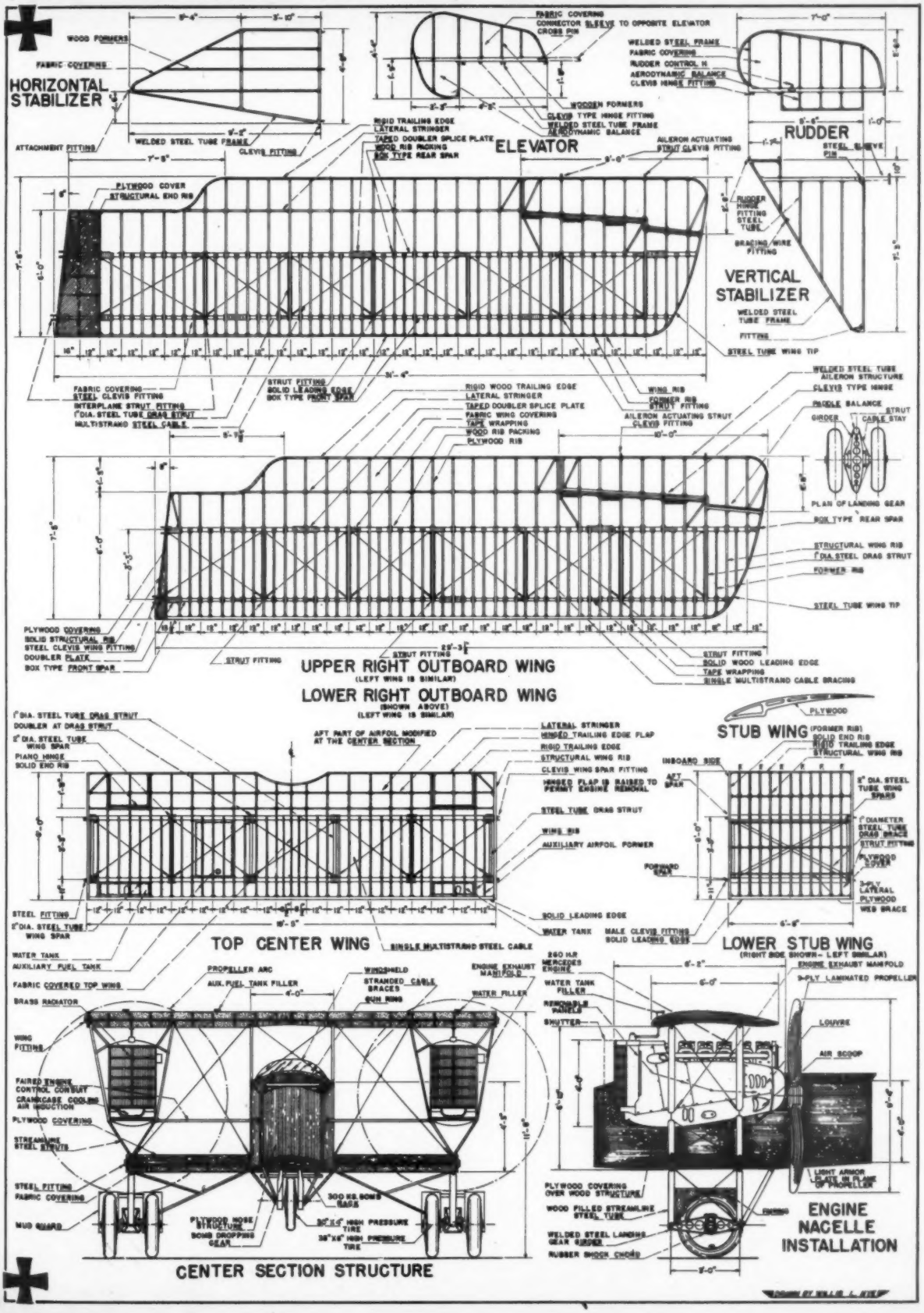


Roscoe Turner's famous golden Wedell Williams Racer with bright red trim makes excellent quickie profile

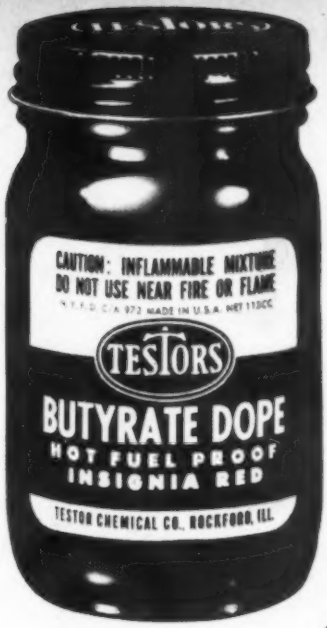


U-control model for those small Half-A engines. You can get it into the air in a couple of evenings.


FABRIC COVERING OF AFT FUSELAGE IS ATTACHED BY LACING ON THE UNDERSIDE. IT CAN BE REMOVED IN ONE PIECE.
INTERPLANE STRUTS WRAPPED WITH TAPE AT INTERVALS
LAMINATED WOODEN PUSHER TYPE PROPELLER (ASH, WALNUT & MAPLE)
REAR WIRE SCREEN MACHINE GUN STOP
PARABELLUM AIR COOLED MACHINE GUN ON CIRCULAR MOUNT, CONSISTING OF U-SHAPED ELEVATION ARM (STEEL TUBE). ARM IS ATTACHED TO PLUNGER TUBE AND CROSSHEAD. GUN MOUNT IS NORMALLY HELD DOWN AGAINST LAMINATED WOOD TURN-TABLE BY A TENSION SPRING. THE GUN FIRING AND CHARGING IS MANUALLY OPERATED. GUN CAN BE LOCKED IN POSITION BY MEANS OF A LEVER BOLT AND A BOWDEN CONTROL. A COMPENSATION WIND DISPT ASSISTED AIMING.
SQUADRON NO.
BALANCED RUDDER
GERMAN AIR FORCE INSIGNIA
RUDDER CONTROL CABLE
VERTICAL STABILIZER BRACE WIRE
FRONT GUN MOUNT SIMILAR TO AFT GUN INSTALLATION
BOMBARDIER COCKPIT ALSO PROVIDED WITH PARABELLUM MACHINE GUN ON RIGID MOUNT
METAL PANELS ON ENGINE NACELLE
WATER TANK FILLER
ENGINE OMITTED FOR CLARITY
MANUALLY OPERABLE RADIATOR SHUTTER IN OPEN POSITION
FUSELAGE JOINT
FAIRED FUSELAGE TOP DECK
VERTICAL STABILIZER IS ADJUSTABLE ON GROUND
INDETERMINATE PRATT TRUSS TYPE WOODEN WIRE BRACED AFT FUSELAGE STRUCTURE
STEEL TUBE
SHOCK CORD
STEEL SOLE
FIXED WOODEN TAIL SKID
INTERNAL SHOCK ABSORBER
PLANE NO.
FUSELAGE JOINT
HORIZONTAL STABILIZER IS ADJUSTABLE ON GROUND
PLYWOOD COVER
FUSELAGE JOINT
TRAP DOOR
FLOOR
PROPELLER THRUST LINE
MUD GUARD
AILERON CONTROL HORN
FAIRING
WELDED STEEL GIRDER
UPPER WING AILERON ACTUATING STRUT (STREAMLINE STEEL TUBE)
11° LANDING ANGLE
FABRIC COVERING
SCALE
BOMBSIGHT
FUSELAGE FLOOR
PLYWOOD STRUCTURE
RUBBER SHOCK CORD AND STEEL SPRINGS
GROUND LINE
COLORATION
FUSELAGE IS BLACK.
ENGINE NACELLES ARE BLACK.
PROPELLERS FINISHED IN NATURAL WALNUT.
TAIL SURFACES IN GRAY.
WING SURFACES IN GRAY.
INTERPLANE STRUTS IN SILVER.
LANDING GEAR IS BLACK.
THE CREW CONSISTS OF FORWARD GUNNER, PILOT, BOMBARDIER, AND AFT GUNNER. THE CREW STATIONS ARE ARRANGED SO THAT CREW MEMBERS MAY INTERCHANGE.
ELEVATOR BUNGEE CONTROL PERMITS PILOT TO TRIM AIRPLANE FOR NOSE OR TAIL HEAVINESS. CONTROLS MAY BE LOCKED IN ANY POSITION ON THE GROUND OR IN FLIGHT.
AFT FUSELAGE IS RECTANGULAR CROSS SECTION. LONGERONS AND VERTICAL STRUTS ARE OF SQUARE SPRUCE WRAPPED WITH TAPE. PIANO WIRE BRACING
FABRIC COVERED STEEL TUBE FRAME ELEVATOR
FABRIC COVERED STEEL TUBE FRAME RUDDER
AERODYNAMICALLY BALANCED ELEVATOR WITH TRIMMING GEAR
PARABELLUM MACHINE GUN
THE AIRPLANE IS INTERNALLY WIRED FOR WIRELESS TELEGRAPHIC COMMUNICATION. THE POWER FOR OPERATION IS SUPPLIED BY AN ENGINE-DRIVEN GENERATOR COUPLED THROUGH A CLUTCH MECHANISM TO THE LEFT ENGINE.
FORWARD AND AFT FUSELAGE FUEL TANKS HOLD 60 GALLONS EACH. CENTER SECTION AUXILIARY FUEL TANK HOLDS 13 GALLONS. EACH ENGINE IS EQUIPPED WITH AN ENGINE-DRIVEN FUEL PUMP
FRIEDRICHSHAFEN BOMBER
TYPE G1 WAS AN EXPERIMENTAL PROTOTYPE.
TYPE G2 (FF-38) BOMBER.
TYPE G3, BOMBER (MERCEDES 260 H.P. ENGINES).
TYPE G3A, BOMBER (MERCEDES 260 H.P. ENGINES).
TYPE G3A, BOMBER (BAIMLER ENGINES).
TYPE G4A, REBUILT 1918. (LATER SCRAPPED).
THE FRIEDRICHSHAFEN COMPANY PREVIOUSLY BUILT SINGLE AND TWIN ENGINE SEAPLANES FOR THE GERMAN GOVERNMENT USING SIMILAR CONSTRUCTION DETAILS.
"FRIEDRICHSHAFEN" BOMBER TYPE G3
(1917)
AS IN OTHER GERMAN WARPLANES, CONSIDERABLE VARIATION EXISTS. CERTAIN AIRPLANES HAD NO NOSE WHEEL. OTHER AIRPLANES HAD A DIFFERENT UPPER AILERON CONTROL SYSTEM THAN SHOWN. OTHER AIRPLANES HAD VARIATIONS IN ARMAMENT. UNFORTUNATELY DUE TO BEING UNDERPOWERED, THE RANGE AND PERFORMANCE WERE POOR.
BRACE STRUT (STREAMLINE SECTION)
BRACE CABLE (STRANDED)
RUDDER CONTROL CABLE (STRANDED)
FUSELAGE FAIRING STRINGERS
PLAN VIEW OF EXTERNAL FUSELAGE BOMB RACK.
CAPACITY 300 KG BOMBS
BOMB SHACKLE
ADJUSTABLE VERTICAL STABILIZER
HORIZONTAL STABILIZER FABRIC COVERED. STRUCTURE OF WELDED STEEL TUBING. WOODEN STRINGERS ATTACHED TO STEEL TUBE STRUCTURE.
TRAP DOOR IN FUSELAGE FLOOR HINGED TO SWING UPWARD AT AFT END FITTED WITH TRANSPARENT PANELS
BALANCED AILERONS AT THE EXTREMITIES OF TOP AND BOTTOM WINGS
HINGE LINE
LOWER AILERON
GOETTINGEN TYPE AIRFOIL
0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
AFT GUN HORIZONTAL GUN TRAVERSE
TUBULAR STEEL AFT GUN MOUNT
LAMINATED WOODEN ROTABLE GUN RING
PUSHER TYPE PROPELLER
WHITE BACKGROUND
SCREEN
(8 KG. BOMBS (6))
TRANSPARENT PANEL IN FLOOR
HINGED TRAILING EDGE FLAP TO ASSIST REMOVAL OF ENGINES
4'-0" CHORD OF CENTER SECTION
ENGINE EXHAUST MANIFOLD
LOWER WING CHORD IS 7'-5"
LOWER WING AILERON
HINGE LINE
FABRIC COVERING
LOWER WING
HONEY VEE TYPE RADIATOR
FAIRED TUBING CONTAINING ENGINE CONTROL CABLES
MAIN WING RIB
INTERMEDIATE WING RIB
BOMBARDIER FOLDING SEAT
PILOT'S SEAT
NEGATIVE RAKE ON WING TIP
SWEEPBACK 6°
AUXILIARY WATER TANK WITH RAM AIR VENT
PILOT'S COCKPIT CONTAINS CONVENTIONAL TYPE FLIGHT CONTROLS
THE INSTRUMENTS ON THE INSTRUMENT PANEL ARE AS FOLLOWS:
AIRSPEED INDICATOR.
ALTIMETER.
LEVEL FLIGHT INDICATOR.
ENGINE REVOLUTION INDICATORS. (2)
AIR PRESSURE GAUGES. (2)
ELECTRIC THERMOMETERS (WATER TEMPERATURE). (2)
PETROL QUANTITY INDICATORS. (2)
ELECTRIC HEATING RHEOSTAT.
MAGNETO SWITCHES (2)
MAGNETIC COMPASS
OUTBOARD INTERPLANE STRUTS HAVE NARROWER CHORD THAN INBOARD
DIMENSIONAL DATA OF TYPE G-3
TOTAL AREA OF MAIN PLANES ..... 934.4 SQ.FT.
AREA OF UPPER MAIN PLANES WITHOUT FLAP ..... 480 SQ.FT.
AREA OF LOWER MAIN PLANES WITHOUT FLAP ..... 454.4 SQ.FT.
LOAD PER SQUARE FOOT ..... 9.24 LBS.
WEIGHT PER HORSEPOWER ..... 16.5 LBS.
AREA OF FLAP OF UPPER WING ..... 21.6 SQ.FT.
BALANCE AREA OF AILERONS (UPPER) ..... 1.8 SQ.FT.
AREA OF FLAP ON LOWER WING ..... 18.0 SQ.FT.
BALANCE AREA OF AILERONS (LOWER) ..... 1.56 SQ.FT.
TOTAL AREA OF FIXED TAIL PLANES ..... 57.6 SQ.FT.
TOTAL AREA OF ELEVATORS ..... 33.0 SQ.FT.
BALANCE AREA OF SINGLE ELEVATOR ..... 1.7 SQ.FT.
CONTROL COLUMN
PLYWOOD DECK
FOLDING SEAT
BOMB DROPPING GEAR
GUN TRAVERSE
PROPELLER ARC
LAMINATED ROTABLE WOODEN GUN RING
TUBULAR STEEL GUN MOUNT
ENGINE NO. 2
ENGINE NO. 1
MANUALLY OPERATED RADIATOR SHUTTERS
AILERON CONTROL HORN
SINGLE STAGGER CABLE
SINGLE FLYING AND LANDING WIRES
TOP AILERON ACTUATING STRUT
DIHEDRAL ANGLE 1°-1/2"
AREA OF VERTICAL FIN ..... 20.0 SQ.FT.
AREA OF RUDDER ..... 18.2 SQ.FT.
BALANCE AREA OF RUDDER ..... 8.0 SQ.FT.
MAXIMUM FUSELAGE CROSS SECTION AREA ..... 19.2 SQ.FT.
OUTER WING PANEL INTERPLANE STRUTS MADE OF FIVE PIECES OF GLUED WOOD
FUSELAGE ON LOWER WING IN THE WING CELLULE
PLYWOOD COVER
STREAMLINE STEEL STRUTS IN ENGINE NACELLE AND WING CENTER SECTION STRUCTURE
BOMB RACK 300 KG. BOMBS
SCALE
AILERON CONTROL CABLES PASS FROM SINGLE CONTROL COLUMN INSIDE LEADING EDGE OF LOWER WING UP TO TOP WING ACTUATING BELL-CRANK. CABLES PASS THROUGH FAIRLEADS ATTACHED TO OUTER INTERPLANE STRUTS.
STREAMLINE STEEL STRUTS LANDING GEAR STRUCTURE
SOLID LEADING EDGE
FRONT SPAR
REAR SPAR
CAP STRIP
PLYWOOD WEB
TYPICAL WING RIB
DRAWN BY WILLIS L. RYE


HORIZONTAL STABILIZER
WOOD FORMERS
FABRIC COVERING
WELDED STEEL TUBE FRAME
ATTACHMENT FITTING
CLEVIS FITTING
ELEVATOR
FABRIC COVERING
CONNECTOR SLEEVE TO OPPOSITE ELEVATOR
CROSS PIN
WOODEN FORMERS
CLEVIS TYPE HINGE FITTING
WELDED STEEL TUBE FRAME
AERODYNAMIC BALANCE
RIGID TRAILING EDGE
LATERAL STRINGER
TAPED DOUBLER SPLICE PLATE
WOOD RIB PACKING
BOX TYPE REAR SPAR
AILERON ACTUATING STRUT CLEVIS FITTING
RUDDER
WELDED STEEL FRAME
FABRIC COVERING
RUDDER CONTROL H
AERODYNAMIC BALANCE
CLEVIS HINGE FITTING
STEEL SLEEVE PIN
RUDDER HINGE FITTING STEEL TUBE
BRACING WIRE FITTING
VERTICAL STABILIZER
WELDED STEEL TUBE FRAME
FITTING
STEEL TUBE WING TIP
PLYWOOD COVER STRUCTURAL END RIB
FABRIC COVERING
STEEL CLEVIS FITTING
INTERPLANE STRUT FITTING
1" DIA. STEEL TUBE DRAG STRUT
MULTISTRAND STEEL CABLE
STRUT FITTING
SOLID LEADING EDGE
BOX TYPE FRONT SPAR
RIGID WOOD TRAILING EDGE
LATERAL STRINGER
TAPED DOUBLER SPLICE PLATE
FABRIC WING COVERING
TAPE WRAPPING
WOOD RIB PACKING
PLYWOOD RIB
WING RIB
CORNER RIB
STRUT FITTING
AILERON ACTUATING STRUT CLEVIS FITTING
WELDED STEEL TUBE AILERON STRUCTURE
CLEVIS TYPE HINGE
PADDLE BALANCE
GIRDER
STRUT
CABLE STAY
PLAN OF LANDING GEAR
BOX TYPE REAR SPAR
STRUCTURAL WING RIB
1" DIA. STEEL DRAG STRUT
FORMER RIB
STEEL TUBE WING TIP
PLYWOOD COVERING
SOLID STRUCTURAL RIB
STEEL CLEVIS WING FITTING
DOUBLER PLATE
BOX TYPE FRONT SPAR
STRUT FITTING
STRUT FITTING
STRUT FITTING
SOLID WOOD LEADING EDGE
TAPE WRAPPING
SINGLE MULTISTRAND CABLE BRACING
UPPER RIGHT OUTBOARD WING
(LEFT WING IS SIMILAR)
LOWER RIGHT OUTBOARD WING
(SHOWN ABOVE)
(LEFT WING IS SIMILAR)
1" DIA. STEEL TUBE DRAG STRUT
DOUBLER AT DRAG STRUT
2" DIA. STEEL TUBE WING SPAR
PIANO HINGE
SOLID END RIB
AFT PART OF AIRFOIL MODIFIED AT THE CENTER SECTION
LATERAL STRINGER
HINGED TRAILING EDGE FLAP
RIGID TRAILING EDGE
STRUCTURAL WING RIB
CLEVIS WING SPAR FITTING
HINGED FLAP IS RAISED TO PERMIT ENGINE REMOVAL
STEEL TUBE DRAG STRUT
WING RIB
AUXILIARY AIRFOIL FORMER
STEEL FITTING
2" DIA. STEEL TUBE WING SPAR
SOLID LEADING EDGE
WATER TANK
MALE CLEVIS FITTING
SOLID LEADING EDGE
SINGLE MULTISTRAND STEEL CABLE
TOP CENTER WING
PLYWOOD
STUB WING
(FORMER RIB)
SOLID END RIB
SOLID TRAILING EDGE
STRUCTURAL WING RIB
INBOARD SIDE
AFT SPAR
FORWARD SPAR
2" DIA. STEEL TUBE WING SPARS
1" DIAMETER STEEL TUBE DRAG BRACE
STRUT FITTING
PLYWOOD COVER
3-PLY LATERAL PLYWOOD WEB BRACE
LOWER STUB WING
(RIGHT SIDE SHOWN - LEFT SIMILAR)
WATER TANK
AUXILIARY FUEL TANK
FABRIC COVERED TOP WING
BRASS RADIATOR
WING FITTING
FAIRED ENGINE CONTROL CONDUIT
CRANKCASE COOLING AIR INDUCTION
PLYWOOD COVERING
STREAMLINE STEEL STRUTS
STEEL FITTING
FABRIC COVERING
MUD GUARD
PROPELLER ARC
AUX. FUEL TANK FILLER
WINDSHIELD
STRANDED CABLE BRACES
GUN RING
ENGINE EXHAUST MANIFOLD
WATER FILLER
300 LB. BOMB RACK
PLYWOOD NOSE STRUCTURE
BOMB DROPPING GEAR
30"x6" HIGH PRESSURE TIRE
CENTER SECTION STRUCTURE
260 HP MERCEDES ENGINE
WATER TANK FILLER
REMOVABLE PANELS
SHUTTER
ENGINE EXHAUST MANIFOLD
3-PLY LAMINATED PROPELLER
LOUVRE
AIR SCOOP
LIGHT ARMOR PLATE IN PLANE OF PROPELLER
PLYWOOD COVERING OVER WOOD STRUCTURE
WOOD FILLED STREAMLINE STEEL TUBE
WELDED STEEL LANDING GEAR GIRDER
RUBBER SHOCK CORD
ENGINE NACELLE INSTALLATION

Look for this self-service counter display at your favorite model-hobby shop.



50¢

1/4 PINT JAR
(THINNER 35c)

PINT CAN
$1.25

PINT CAN
$1.25

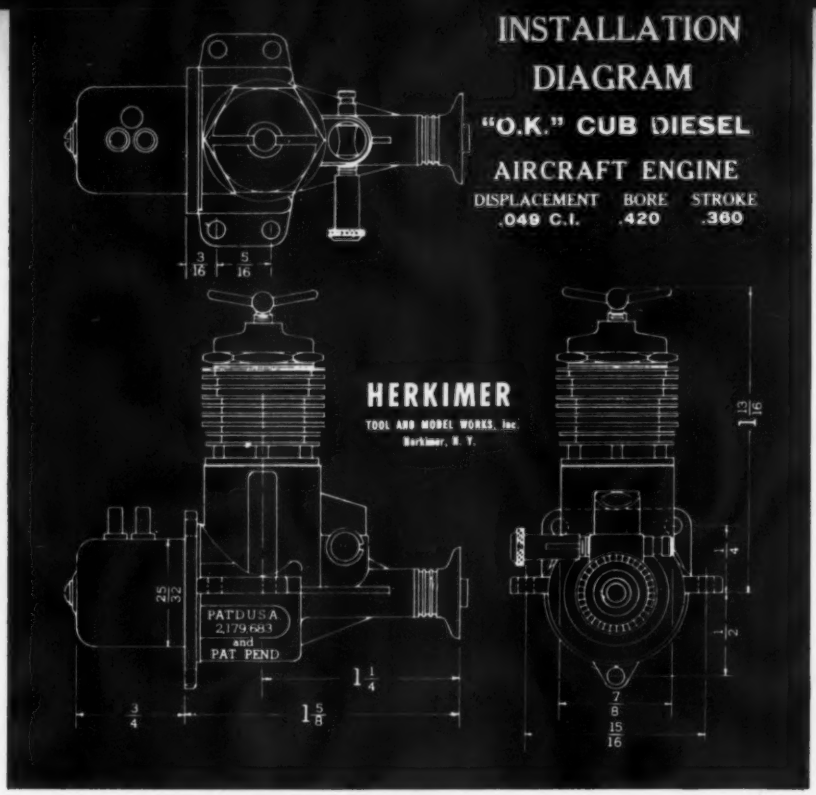
PINT CAN
$1.00

ENGINE REVIEW

Startling report indicates that the Herkimer .049 Diesel may outperform its glow plug brother!

▼

by E. C. MARTIN



Use this full size three-view for planning installation of the engine. It is beam or radial mount.

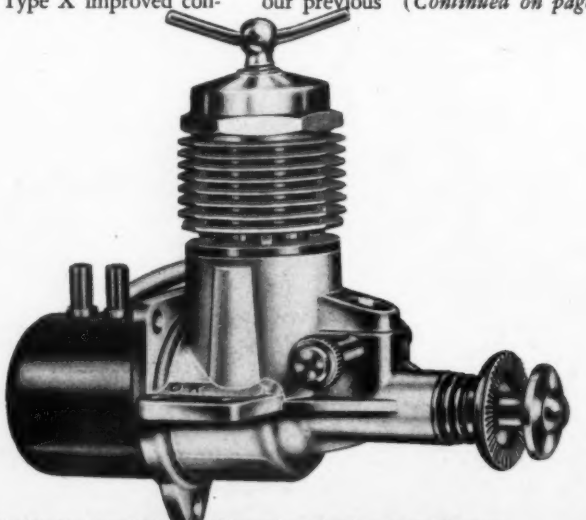
▶ In outward appearance this new offering from Herkimer is absolutely identical with the .049B glow plug engine except for the Diesel head. Apart from slightly different relative positioning of the top radial mounting holes, and intake shape, it is also a scaled down replica of the .075 Diesel, and with the .049 displacement so well represented these days, the new Cub is especially interesting, since it permits an accurate performance comparison with its glow operated team mates.

Internally, there are several important differences from the .049X and B working parts. The conrod is machined from steel bar with drilled and reamed bearings, and finally heat treated, whereas the glow Cubs feature aluminum rods. The crankshaft is dimensionally identical except for a 9/64 in. dia. gas passage in place of 11/64 in. dia. on the glow type, and a circular valve port with a flat at its mouth is used in place of the normal cavernous rectangular port. The logical result of these modifications is reduced volumetric efficiency and potential bhp, but considerably greater crankshaft strength, which is compatible with the Diesel characteristics of low peaking speed and high torque. The cylinder is longer to accommodate the contra-piston and is threaded externally for the head which houses a shock absorber, contra-piston stop and compression screw frictioning device of exactly the same design as the .075. Yet, in spite of these "extras," the over-all height of the Diesel is slightly less than that of the glow versions with plugs fitted. The Diesel cylinder has one less cooling fin, but otherwise they are similar in all respects.

Elsewhere in the engine, the only detectable differences are a slightly smaller spraybar diameter on the Diesel and some very minor alterations in the crankcase machining, which are probably standard on all the .049 types in current production.

In order to take full advantage of this unique opportunity for comparing the Diesel system with the glow, and their respective merits, we are reprinting the .049X test figures alongside those of the new engine, and they should convey more information more convincingly than any amount of words. However, the figures are very different from those anticipated and appear to contradict all previous comparisons of the two types. It can only be said that the Type X improved considerably several running hours after the test, whereas the Diesel may be an outstanding example, which only time will show.

Apart from this, there is the fact that production engines do vary one from another by as much as 10 per cent, which makes engine comparisons on the basis of the one example of each type rather undependable. It therefore follows that manufacturers handling thousands of engines of various types are the only people who ever get a true picture, and having had that experience, we can only reiterate our previous (*Continued on page* 49)

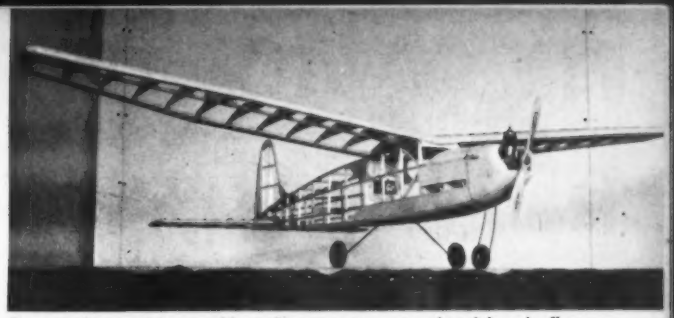


Looks like the glow Cub with different head but has special features.

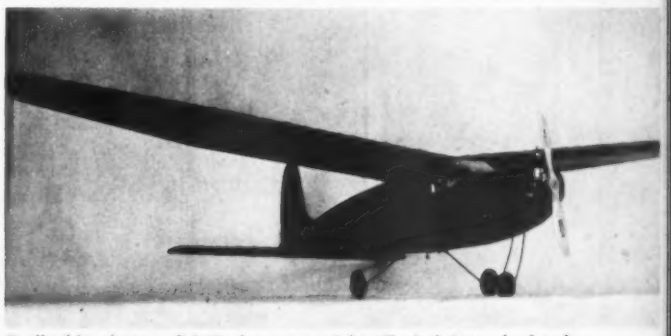
Before & After

Progress in plane design is so swift that builders extensively modify existing RC kits to suit their individual desire. Believing that many of these adaptations are of general interest, MAN presents a typical modification on popular Bootstraps.

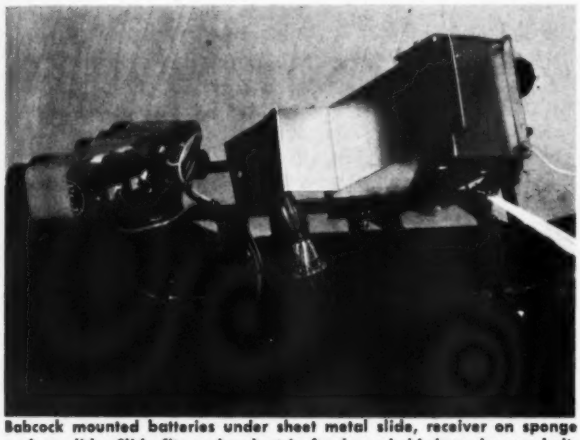
by S. K. BABCOCK



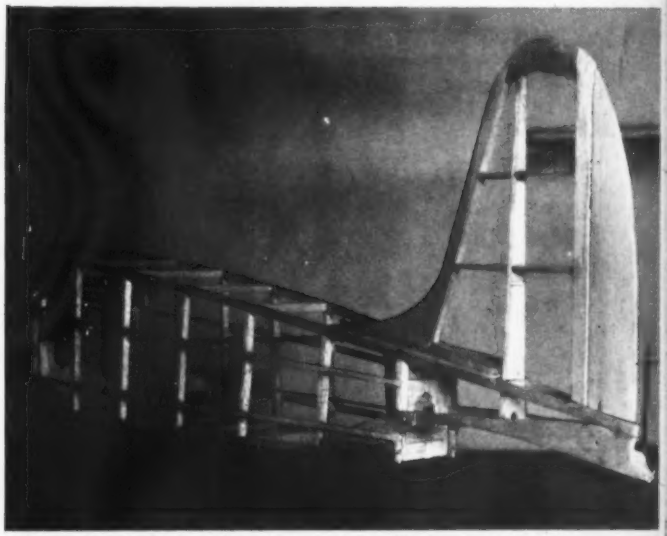
One man's meat! Removable radio compartment replaced by ply floor for midship rigidity, to attach gear, provide mount for switch, jack, etc.



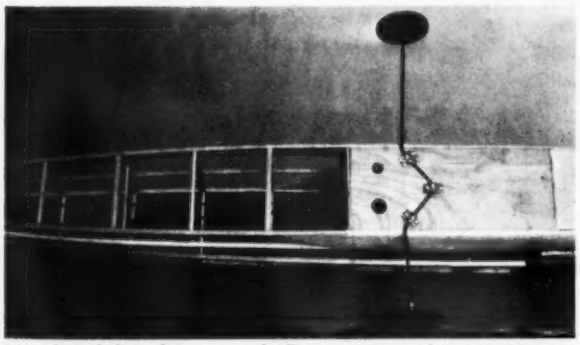
Really big change, 7-1/2 degrees straight dihedral instead of poly, smoothed out turn entries and eliminated rocky exists. Some like poly.



Babcock mounted batteries under sheet metal slide, receiver on sponge pad on slide. Slide fits under cleat in fuselage, held down by one bolt.

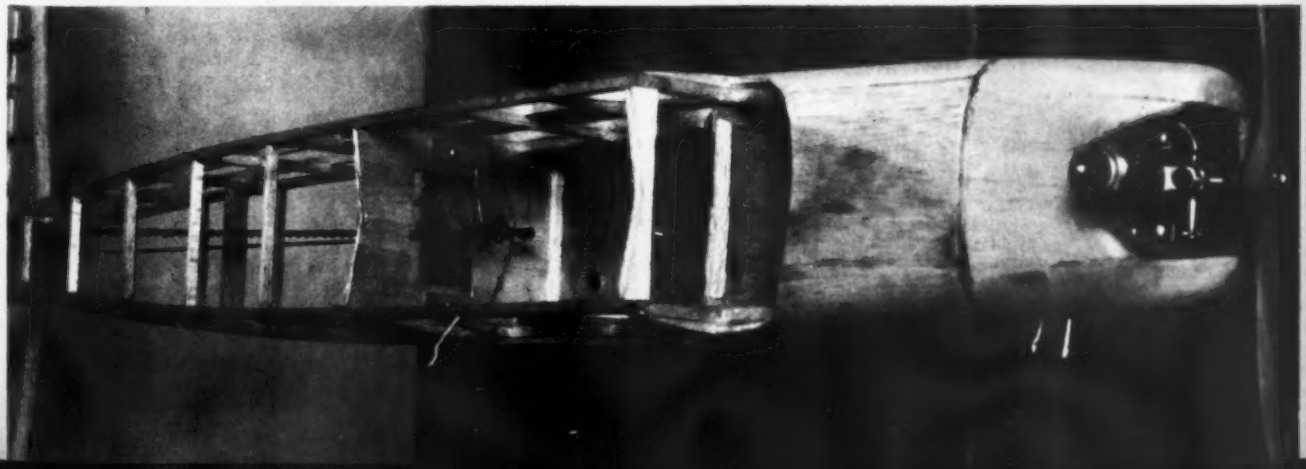


Full length, rather than split rudder, used for effective control. Moving CG forward smooths out turns; try it any ship, with more neg in stab.



View from below shows new ply floor, a compound type escapement, torque rod (don't forget fairlead), rubber. No-wobble wheels for take-offs.

Escapement forward to aid CG position. Knock-off nose converted into rigid unit cemented to firewall. Cub .09 engine; 8 x 3-1/2 prop is .09 best.



FOREIGN NOTES

P. G. F. CHINN

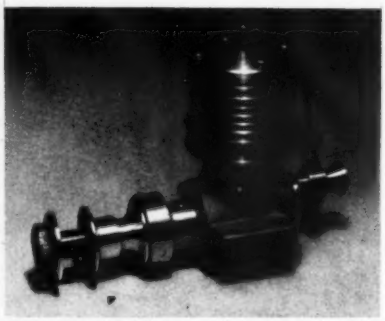
New and fascinating ideas are a dime a dozen. Many of them hold possibilities for the American modeler to try out something new and different.

by P. G. F. CHINN

This month we have a good deal of news on new motors from various parts of the world.

Great Britain

Our mention, in the March Foreign Notes, of the new Davies-Charlton-built Allbon "world's smallest" Diesel brought forth a lot of inquiries from prospective owners. This motor will be available by the time these words are printed and is being imported by American Telasco. Talking to E. H. Davies of Davies-Charlton, Ltd., we learned that getting this engine (now named "Bambi") into production, had proved a real headache. Production technique and inspection have had to be tied up much more rigidly than with any "normal" size small engine and many unforeseen delays have occurred through D-C's unwillingness to take any chances with possible sub-standard production.

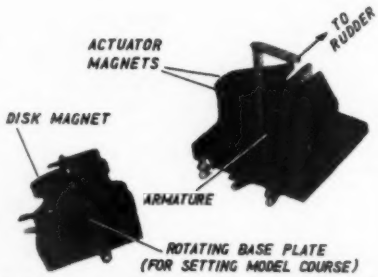


Most powerful Diesel marketed, British Miles Special, twin BB, rear disc, .29 displacement.

We have just been testing one of the very first production models. This differs slightly from the original prototype illustrated in the March Foreign Notes. The original displacement of .006 cu. in. has now been raised to .009 cu. in., bore and stroke now being 7/32 x 1/4 in. Also the finned cylinder barrel has a slightly different external shape and the makers have reverted to a conventional compression lever in place of a knurled knob. On the 4-1/8 in. diameter beech prop supplied with the engine, we recorded 16,000 rpm. The Bambi is a thoroughly practical power unit for really tiny models, but it is fairly sensitive and it is definitely *not* a beginner's engine—a point which the manufacturers have asked us to emphasize.

From the smallest Diesel to the biggest: We are often asked about Diesels in the bigger sizes: .19-.30 cu. in. displacements. Generally, the Diesel does not compare so well with glow plug here. The Diesel combustion process is essentially one of "detonation"—something full-size engine designers are always trying to combat—but the relatively rough running which this promotes only becomes apparent in the larger model sizes. Diesel advantages begin to be outweighed by disadvantages between .15 and .20 cu. in. displacement. A really hot .15 Diesel has a slight edge, in power, on a Torp .15, but at .19 displacement, no Diesel has yet been made to touch the .19 Torpedo. Result is that early Diesels of around .30 cu. in. and bigger have disappeared from European markets and, with virtually only one exception, there are no modern equivalents.

Exception is a British .29 disc-valve twin ball-bearing job now being put out by E.D. This engine first made an unobtrusive appearance in 1950 as a custom-built job, designed and built by Basil Miles. It was designed for high-speed but we found it fine for big 7 lb. RC jobs when fitted with a smaller carburetor and dubbed it "Miles Special" in a subsequent write-up, the name by which it is now commercially known. Photo shows current production model which is also available with water jacket for boat work.



Pathfinder automatic directional control unit. A compass switch, left, works actuator, right.

Also from Britain is a new Amco engine, the Atom, of 1.5 c.c. (.09 cu. in.) This follows a conventional shaft valve radial port Diesel layout popular in the 1.5 class, but has Cub type beam/radial mounts.

Japan

Recently, we received two new O.S. motors from the Ogawa Model Manu-

facturing Co., Osaka, Japan. One was the new .29 which shows detail improvements over the original O.S. .29 we examined two or three years back. Externally, the new model can be distinguished by its revised crankcase design embodying strengthened beam mounts and a dividing lug in the exhaust stack.

The other motor was the O.S. .099 which looks like a scaled down .29 and is very neat. It even has the .29's brass glow plug thread insert in the head. Both are front rotary engines with circumferential porting. They are original designs, *not* copies of any Western motor, and are well made.

Germany

The new Webra Half-A Diesel, which was mentioned in the April MAN, has now been named "Piccolo" — not after "Piccolo Pete" who went "peep, peep, peep," we imagine, but from the Italian which just means "small." Piccolo has a bore and stroke of 10.5 mm. by 9 mm., giving an actual displacement of .0476 cu. in., which puts it in competition with the McCoy and Cub .049 Diesels, although its price tag is likely to be slightly higher than that of domestic products. Other data: shaft intake valve; circumferential ports; two-point radial mount like McCoy, Atwood; height (to cyl. head) 1.67 in.; weight (*mit* tank) 1-7/8 oz. First examples should start reaching U.S. shortly. Distributor is Polk's Model Craft Hobbies, New York City.

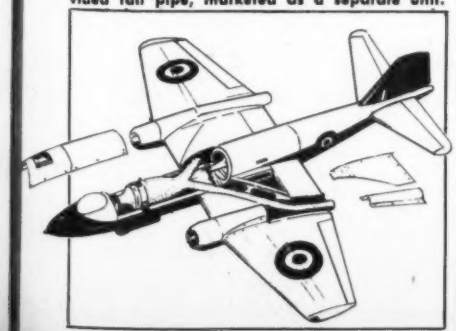
Holland

For the 1954 season, Holland's Veenhoven Typhoon R.250 ball bearing high-speed Diesel has been improved and now has a hard-chromed cylinder-liner, larger diameter crankshaft and a bigger bypass. Power now exceeds .30 bhp, putting the R.250 in the very front rank of .15 International class engines.

Norway

Norway's only production engine, the rugged and well-built David-Andersen, has been completely redesigned and has a new piston and cylinder layout. Porting has been modified and the engine now has a separate finned barrel of aluminum over a steel liner, instead of the one-piece cylinder formerly used. Of similar design (*Continued on page* 42)

Unique Japanese Canberra has a special divided tail pipe, marketed as a separate unit.



FLASH NEWS

By ROBERT McLARREN

Will Lockheed counter the DC-7? A new look in fighters? The air world changes before your eyes.

The Missile Parade continues this month with official revelation of two more heretofore secret weapons: the Corporal and Honest John. Corporal is a supersonic surface-to-surface rocket-powered missile capable of mounting an atomic warhead. While specifications are closely guarded, the U.S. Army, who sponsored its development, admits it has "a range enabling it to strike selected targets deep in the enemy rear areas." Corporal, not to be confused with the more familiar "WAC Corporal" research missile, is in quantity production by Firestone Tire and Rubber Co. in Akron, Ohio. Its electronic control equipment is manufactured by Gilfillan Bros., Los Angeles, Calif.

Honest John is a short-range (about 30 mi.) artillery rocket designed to give a boost to conventional artillery fire. It is a huge, rocket-powered artillery shell 30 in. in diameter and containing enough high explosives (non-atomic) to produce "the demolition effect of hundreds of artillery shells." It is aimed and fired in the same manner as conventional artillery from a highly mobile launching rack.

The demand for executive aircraft is increasing so rapidly that William P. Lear, chairman of Lear, Inc., predicts business flying in the U.S. will increase ten-fold in the next 10 years. Thus, instead of the 8,000 business planes now flying, there would be 80,000 by 1964. "And this estimate is conservative," says Lear. "The increase may come within five years." In answer to this demand, Beech Aircraft Corp. has increased its executive aircraft production schedules by 50 per cent. Monthly rates now are 33 four-place Bonanza, 13 six-place Twin Bonanza and four eight-place Super 18.

Cessna Aircraft Co. has been awarded a $1.2-million contract from the Navy for 25 model OE-2 aircraft. The new model is similar to the Army's extremely popular L-19 Birddog liaison plane but features a higher fin and a larger cowling.

Lockheed has completed first test flights of an Allison T56 turboprop engine fitted in one nacelle of the company-owned test Super Constellation. The T56 engine, together with its nacelle, is designed for use in the Lockheed XC-130 four-turboprop transport now nearing completion at the Burbank, Calif., plant. The California plant will build the two XC-130 prototypes while quantity production is scheduled at the company's Marietta, Ga., facility. The new T56 is an improved T38 featuring an increase to 3,750 hp.

Trans-World Airlines has officially admitted that American Airlines' Douglas DC-7 is hurting TWA's transcontinental business. (United Air Lines will also place the DC-7 in service in direct competition over transcontinental routes with TWA—*Ed.*) TWA's president, Ralph S. Damon, has told Lockheed Aircraft Corp. that the DC-7 is "appreciably faster" than the Super Constellation and hopes the company can meet its challenge. "Frankly," Damon says, "we in TWA are concerned about it and feel that Lockheed should find a way to do something about this problem, which is immediate and very real." TWA has been the largest user of Lockheed transports, having purchased 20 Super Constellations and having 81 Constellations now in service.

The Grumman F9F Cougar jet fighter has now entered its eighth version. The new F9F-8 swept-wing fighter features a replacement of its nose flaps with a fixed, cambered leading edge. While this sounds to us model builders as a fine built-in drag, Grumman engineers point out that the wing chord is extended 15 per cent in the operation, giving it a reduced thickness ratio and, therefore, lower drag. And the new "low-speed" wing greatly improves stability and control at high altitude and at all speeds. The F9F-6 was the first swept-wing Cougar and was powered by a Pratt & Whitney J48 turbojet engine. The F9F-7 is the same airplane but powered by an Allison J33 engine. The F9F-8 returns to the P&W powerplant.

Keep your eye out for the Super-B-57 now on the way at the Glenn L. Martin Co. Martin engineers have developed a two-seat, high-altitude fighter version to be powered by two Pratt & Whitney J57 turbojet engines of 10,000 lb. thrust each. Air Force orders for the fighter version as well as two others are being prepared as soon as production arrangements can be completed for supply of J57 engines from the new Ford Aircraft Engine Division at Chicago. The B-57, it will be recalled, is the English Electric Canberra bomber built under licensed by the Martin Co.

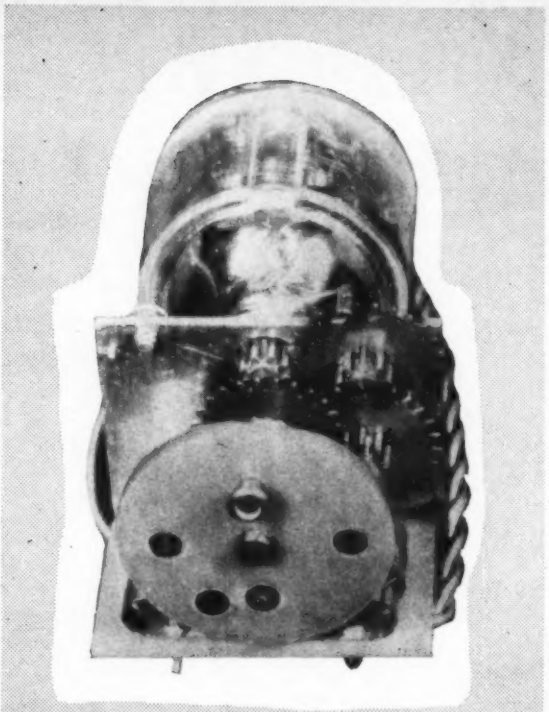
Boeing Airplane Co. has finally settled a provocative question bothering aviation fans: the new Model 707 will be known as the Jet Stratoliner, in the transport version, and the Jet Stratotanker, in the tanker version. Alternative was the unwieldy Superstratocruiser, a pretty bad idea to be sure.

You don't have to worry about the U.S. aircraft manufacturing industry for at least the next few years. On Jan. 1, 1954 (the latest date for which figures are available), the backlog of orders on the aircraft industry's books stood at $16,798,000,000. Nor do you have to wonder where all that business came from: the military services account for 93 per cent of the aircraft, 97 per cent of the engine and 89 per cent of the propeller orders.

In a recent contest between the Douglas DC-7 and the de Havilland Comet, the DC-7 won out! The contest was for orders for Aerolineas Argentinas, Argentina government airline, which plans the purchase of six new four-engine transports and had been considering the Comet and the DC-7. The Argentine airline pointed out that prominent in its decision was the fact that on some occasions the transport would be used for medium and short-range routes, which the DC-7 could handle economically but which might prove very costly with the Comet. It is a well known fact that the DC-7 can fly from London to Johannesburg in faster time than a Comet, believe-it-or-not! (Reason: the larger number of time-taking fuel stops for the Comet.)

The Army is taking an inexpensive look at new light planes. In recent years, the Army has purchased one or two models of various liaison planes and helicopters for evaluation. Now, however, the Army has come up with an even cheaper way of finding out what it wants to know. It has awarded a small contract to Robertson Development Corp., St. Charles, Mo., for the conduct of specific flight tests of its new Skylark light plane. The new plane features double-slotted flaps and shroud extensions of the wing, enabling it to fly as slowly

(*Continued on page* 36)



SERVO SHOWN TWICE ACTUAL SIZE
PATENT PENDING

Here They Are!

MULTI-SERVOS

POWERFUL-DEPENDABLE

MOTOR DRIVEN R/C ACTUATORS

Check these 10 Exclusive Features!

1. Multi-Servos provide *selective* control positions!
2. They use *any* radio, require *no special* equipment!
3. Offer *multi-controls* with simple radios!
4. Provide *more power* than can be used, over ½ lb. of torque!
5. Use the very *minimum* of batteries!
6. Give extreme battery life, *5000* operations on 2 pen cells!
7. Are fast and *positive* in action!
8. They are *lighter* in installed weight!
9. No rubber bands are used!
10. Come ready for use in *any type* model!

Multi-Servos are made in 4 different models to fit every R/C need. Choose the one or combination to do the job you want done right!

MODEL 2PN . . . $11.95
Two positions with an automatic neutral for single control operation.

MODEL 3PN . . . $14.95
Two positions with an automatic neutral, plus a 2nd servo circuit added.

MODEL 2P2N . . $11.95
Two positions with two neutrals; use with 3PN for a 2nd air control.

MODEL 3P $10.95
A three position actuator without an automatic neutral, engine control.

A product of the
DeBOLT MODEL ENG

THE VERY FINEST FOR RADIO CONTROL

"LIVE WIRE"

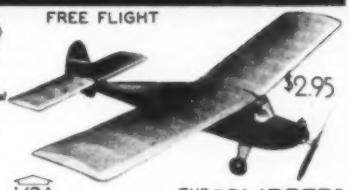
The name that signifies the PROVEN BEST for all R/C flying.
Only with Live Wire Models do you get all of the Superior design Features!

$6.95

THE "TRAINER" 08-15 ENG
THE WORLD'S MOST POPULAR R/C MODEL!

NEW!

FREE FLIGHT



$2.95

1/2A

THE "CLIPPER"

$14.95

THE "SENIOR" 19-23 ENG. CUSTOM BUILT

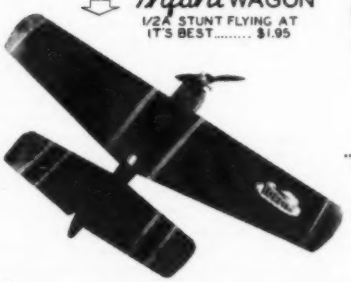
LIVE WIRE "Cruiser" $3.95
dmeco's NEW REALISTIC RADIO CONTROL MODEL!

Typical of the Live Wire models is the Cruiser. Its well balanced design provides extremely realistic flight with fine control response and great weight carrying ability. Construction is simple and rugged. Exclusive in the commercial R/C sets, Live Wire kits are complete with finest A1 materials, precision finished ready for assembly. Plans are full size and include instructions for building, radio installation and flying. All necessary hardware is group including R/C bellcranks and horns.

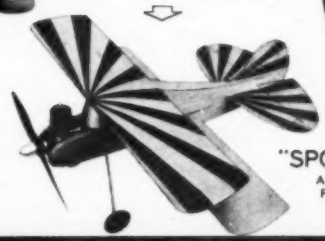
THE "KITTEN" R/C

DMECO MODELS FOR FUN AND PLEASURE

Infant WAGON
1/2A STUNT FLYING AT IT'S BEST..... $1.95



"New BIPE"
FOR SPORT & STUNT TRAINING..... $3.95



"SPEEDSTER"
1/2A TEAM RACING KIT.... $2.50

"SPORTWING"
A REAL COMBAT FLYER..... $3.95

Ask your Dealer to Show You any "Dmeco" Model **TODAY!**

PRODUCTS OF
THE DE BOLT MODEL ENGNR. CO.
WILLIAMSVILLE, N.Y.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

as 25 mph. Under this new contract arrangement, the company will perform the special flight tests desired by the Army and furnish a report of the results.

In this age of electronic computing machines and multi-million-dollar wind-tunnels, it is of interest to note that Convair has turned over a 340 Liner to veteran racing and test pilot Ben O. Howard to "see what he can do" to increase its cruising speed. Howard already sees the possibility of a 12-15 mph increase through simple "drag clean-up," particularly in the engine cowling area. Perhaps there's nothing like an "old hand" to confound the modern wizards.

Boeing has developed an arrangement of 33 RATO (rocket assisted take-off) bottles around the belly of the B-47E Stratojet bomber, replacing the 18 units previously mounted in the fuselage. With new water-injection equipment for the six General Electric J47 engines, the B-47E now has no less than 75,000 hp available for take-off!

The German Air Force—when and if it is permitted—is scheduled to receive Canadair-built North American F-86 Sabrejet fighters. While this may be somewhat jarring news to World War II Air Force veterans, German membership in NATO is now being organized and its equipment scheduled. The Sabre fighters will be turned over to the GAF by the Royal Air Force, which has been using them pending delivery of the long-awaited Hawker Hunter jet fighters.

A new business for the airlines—supplying executive aircraft—may be pioneered by Capital Airlines, who have just sold three Douglas DC-3 transports to U. S. Steel Corp. Capital will furnish complete crews and perform maintenance on the airplanes for the corporation. Actually, this is not the first such arrangement. Several years ago Capital sold its three Super DC-3's, the only ones ever built commercially, to U.S. Steel and has been furnishing crews and maintenance on these planes.

First production Boeing B-52A Stratofortress has been completed and it rolled from the factory to reveal a redesigned nose. The new production flight deck features an airline-type cabin with side-by-side seating for pilot

and co-pilot, whereas the XB and YB models utilized single-canopy tandem seating as in the B-47 Stratojet bomber. The new nose makes the production model three feet longer. Boeing has large production orders for the giant, eight-jet intercontinental bomber.

Pan American World Airways has introduced a European custom centuries old into its trans-Pacific operations: first and second class accommodations in its airplanes. In order to have a flexible arrangement to handle varying numbers of each class, PAA has developed quickly removable seats and a movable partition. The first class section in the front of the cabin features plush seats, meals and luxurious comforts. Aircoach-class seats are simple and meals are less sumptuous. The big Boeing Stratocruiser transports will leave San Francisco for Honolulu with a mixed load and in Hawaii the accommodations can be changed quickly to suit the variation in numbers of each type fares scheduled for continuation to Australia. Other domestic airlines have sought this type arrangement in the past but have always been refused permission by the Civil Aeronautics Board on continental routes.

The Convair XF-92A, first delta-wing aircraft, and the Northrop X-4, first swept-wing research airplane, are now museum pieces. The XF-92A, prototype for the new supersonic Convair F-102 fighter, and one of the X-4's will go to the Air Force Technical Museum at Wright-Patterson Air Force Base, Ohio. The other X-4 will go to the Air University at Maxwell Air Force Base, Ala.

Republic Aviation Corp. is a company to watch during the next few months. After turning out the famed Thunderjet for five years and the new swept-wing version of the same plane for the past year, the company will have some new things to show shortly. Scheduled to fly shortly is a turboprop-powered version of the swept-wing fighter, the F-86H. The new fighter, designed for long-range escort duties, features a "T-tail" configuration in which the stabilizer is mounted atop the fin. Most exciting new Republic aircraft, however, is in the XF-103, which is described as a stiletto-nosed supersonic fighter with tiny delta wings on either side of the fuselage. END

Can you Handle that Power

(*Continued from page* 11)

the ordinary pylon model.

If such a force arrangement were used, it would seem that the model should fly the same regardless of engine speed. There should be no nosing-up effect with increased speed. Increased speed would mean increased drag at the line of resistance, but with the engine thrust pulling directly forward on the line of resistance, a balance should result.

Another consideration is the effect the raised propeller slipstream would have on the pylon and rudder. It would seem that with the engine mounted high, the twisting slipstream effect would be less. Perhaps the rolling influence of engine torque would be minimized.

To test these speculations we built three Half-A high-engine-pylon models. Wing area, 292-300 sq. in.; stabilizer, 105 sq. in.; 7 per cent airfoil section; weight 5-1/4 to 6 oz. No thrust offset or stabilizer incidence; wing set at plus 5/16 in. The ships were made as streamlined as possible and the most powerful Half-A engines were used.

The high engine mount is a little extra work; the pylon must be stronger. For the Half-A size, the engine mount adds 3/8 to 5/8 of an ounce. The high engine position is a good propeller saver.

The ships fly best *straight* under power. We used slight left rudder tab to achieve straight climbs initially and the climbing patterns have been all right ever since. Drag tabs on the wings take care of the glide circle.

So we may conclude:

1. No looping tendency. Regardless of the engine power or climbing speed, no loops or associated maneuvers.

2. The high-engine-pylon models fly the same flight pattern under low or high speed. The models were adjusted to fly straight under power and, once adjusted, kept the same grooved climb.

3. The height gained in the climb is consistently higher than similar pylon models because the model flies in the direction you aim it: no looping, wingovers, or other climb gymnastics. The tracked climb keeps the model going up steadily. The forward speed isn't wasted in climb-killing rolls.

4. Propeller pitch and diameter changes don't appear to affect the flight pattern as they do with a regular pylon model. In an effort to see what changing the propeller would do to the climb, we tried all kinds, from 5-2 to 7-4. Other than a change in climbing speed, no effects were noted from torque.

Impressed with the climb control of the Half-A test models, Joe Vermoch built the configuration to FAI gas size. His model weighed 18 oz. and used a 460 sq. in. wing with an eight per cent section. A K & B .15 engine was installed—far more power for the size model than Half-A ships.

The flight pattern was similar to the Half-A test models: no loops and the power flight was under control at all times, a fast, high-angle straight climb.

A solution to power problems? Build a high-engine-pylon model and see what *you* think.

END

Radio Control News

(*Continued from page* 22)

the tuning control. If you can't hit the trail to the land of the Pueblo and Navajo, see your dealer about this really new and reliable single hard-tuber.

Whoever said the Southland was "down a lazy river" didn't reckon with the Ecco Manufacturing Co. of Smyrna, Ga., which now markets our Number Two rave notice this month. The unit is a compound actuator, giving rudder and elevator control and using but one strand of rubber. It measures 1 x 2-1/4 x 3 in., weighs 2 oz., and operates on 3 to 6 volts. We believe this escapement to be the first unit of its kind to come out in quite a few years. The various controls are obtained by use of extremely low friction cams.

For quite some time we've been intrigued by a British tube for receiver work known as the DL-66. This 1-1/2-volt, 15 ma filament tube is versatile, being capable of operating as a detector, amplifier, or output tube. It now is available from Polk's Model Craft Hobbies of New York City, along with data sheets. This should prove to be an all-around good tube for that tone job you may have planned.

RCA markets special batteries in a 2 ma and 10 ma capacity which have the unique feature of being able to be sliced up to obtain the desired voltage. For transistor work this is highly desirable. This type of battery is excellent also for obtaining the correct amount of bias on receivers and transmitters.

Technical Topics

In response to many letters, we should like to mention that a great many of our readers are new to radio control and therefore we have striven to acquaint them fully with the fundamentals of RC. On the other hand, we have another large group of advanced and experienced builders and fliers who may at times become a bit perturbed by "rehashes." To these we say, hold on a bit longer—we've got advanced gear ready to break soon. In the meantime, we think the old-timers would rather see two good beginners start and *stay* in radio work than see a new receiver each month.

Several letters have been received regarding the so-called instability of the Johnson receiver published in MAN in April, 1953. Paul Johnson, the designer, has given us a circuit change which corrects this condition. In this illustration, the section in dotted lines is changed as shown. Hope this helps the few of you who have run into this difficulty. This

condition sometimes is brought to light when a quantity of receivers or transmitters are built and the component values and tubes are not precisely what the designer had used originally.

The Burgess Battery Co. has sent us a news release copy on the care and general use of dry cells and batteries. We have mentioned most of these points many times, but they are well worth repeating, plus a few new ones: (1) Store batteries in a cool, dry place. Moisture may cause shorts and heat will dry them out; (2) Check batteries with a voltmeter, while under load; (3) Handle batteries carefully. Dropping them will crack seals and possibly break internal connections; (4) Use batteries or cells for short periods of time. Using a battery too long or pushing it too hard causes an excess of hydrogen gas which may not be absorbed by the chemical compound. When too much gas is generated, leakage may occur, and no battery can be said to be absolutely leakproof when used too long or too hard at a time.

Treat your batteries with care and they'll give you long life and efficient performance. Burgess has been making batteries for model use since the middle thirties. It would pay us all to heed their good advice.

Club News

From the West Coast we learn that those ever-active Californians are pushing ahead steadily with their RC boats. At a contest held in March, Charles Thompson of Los Angeles took first prize with a perfect score of 400, over the course we outlined in the March issue of MAN. Anthony Cheboucas of San Bernardino won the first place beauty event, his prize being the Wavemaster boat imported from England. Incidentally, a double-size Wavemaster, approximately 5 ft., was used to cross the English Channel using ED equipment.

While on the subject of Channel crossings, R. L. Brown, our informant on this subject, hopes to cross the Catalina Channel sometime in June, using dual Cameron .15 (marine engine) power in a Shoreboat. The controls will be by Babcock and Bonner and this, my friends, will be a test of man, boat, and equipment, because the Catalina Channel is not a mere backyard stream. It is interesting to note that Sterling Models, Dumas Products, Bonner Specialties, and Ray-O-Vac have donated nautical prizes for this contest. All RC boat fans throughout the country should contact R. L. Brown of 129 N. Oak St., Chino, Calif. The concensus out there is that an electric drive boat has the same chance as a gas engine job, provided the builder chooses the correct motor or engine and, above all, knows how to handle his boat.

Last March we were interested in finding something unusual for an RC stunt at a local affair. In checking over the possibilities, we thought of a cross-country record attempt. We checked with Walt Good and the AMA and found that there are specific rules set up for such an event. Any means of transmission (light rays, radio, etc.) is allowed but the transmitter must be at the starting point at all times during the flight. The plane must land within one kilometer of the designated point of landing. Right now we're still looking for a fairly level stretch of country. Oh for the good old days out in Albuquerque where one can see for 80 to 100 miles on a clear day!

For those of you who are interested in tone control, we suggest you contact Jerry Smieska, Secretary of the Milwaukee Flying Electrons, 2100 E. Webster Place, Milwaukee, Wis. This active group of more than 30 members has in the process of construction a six-channel tone receiver using Hammond organ audio chokes instead of reeds. A mighty interesting project and one on which we hope to have more details in a future column.

From Lt. j.g. H. F. Hillman, stationed in the Philippines, we learn that the Philippine Government has recently authorized operation on 27.255 mc. Lt. Hillman has devised a reed

receiver of somewhat unconventional design. It consists of a 1T4 RF stage, 1R5 audio converter, 1S5 audio, and 3V4 audio to the reed bank. The 1R5 audio converter uses one grid in a crystal oscillator circuit and the signal is fed to another grid, thus mixing and producing an audio tone. The crystal controlled transmitter has its frequency shifted very slightly by changing the tuning of the final tank circuit. This shift in frequency is very, very slight and the frequency tolerance still is well within the limits set by the FCC. After all, we have a 25 kc band spread each side of the center frequency of 27.255 mc and we change this only by the amount of the audio frequency used, usually less than 2,000 k.

As we go to press, Vic Weissbrodt of the Milwaukee Flying Electrons sends in some rather interesting, if not terrifying, RC news. We've seen big ones and little ones but *this one*... ! We have no pictures of it yet, but what would you think if you saw a 20-ft., 145 lb. plane being pulled along by a 4-ft. home made aluminum prop, which was turned by a 2-1/2 hp Briggs and Stratton washing machine motor? After pushing back the wing with a 28 in. chord, you'd probably see a six-channel receiver as described above. Schlitz may have made Milwaukee beer famous but this job may put the old town on the RC map (*Or wipe it off.—Editor*) as soon as they change the prop and do a bit of gearing on the motor, to get a bit more power. More later, fellas. In the meantime, there are still a lot of good kits on the market.

The West Coast is still a hotbed of radio control work, as reported by F. B. Finney of 863 Denby St., San Diego, Calif. The San Diego Radio Modelers have elected E. J. Brown as president, Ivan Hartzell as vice president and Frank Finney as secretary-treasurer. Most activity is with gas tubes on 27 mc, and this club has come up with an excellent idea for group flying. First, *all* transmitters are impounded upon the contestants, arrival at the flying site. They are tagged with the owners' names and are "issued" only when the contestant is ready to make an *official* flight. They've been doing this in England for quite some time with excellent results and it appeared that it was only a matter of time before a group in this country would disregard the opposition against it and put it into practice here. This means no more "accidental" signals going out from a ground transmitter when someone else is in the air. We believe this system to be only sure way (receivers should not be turned on either) of eliminating interference at a flying site, that arises from testing out of turn, etc.

And here is what we've been waiting for for a long time. A scale RC event. The West Coast did much to promote scale gas jobs back in the early days of gas job flying and now they're at it for RC work. Points are given for workmanship and scale rendition (a maximum of 50 points) in addition to the amount that can be picked up when flying the regular precision pattern. Here, however, the plane must gather a minimum of 25 points to qualify and prove it is under control. Nothing looked finer at the '53 Nats than to see the West Coast boys take off across the runway and then "pull back the stick" and clear the 6-in. grass, level out and then start their climb with a scale-type Cub design.

Jim Kerley of the Los Angeles Radio Controllers sends pictures of his DMECO Kitten powered by a Wen-Mac .049 and using our two-tuber. Jim reports that scale jobs are also going over big in the LA area, even with the pilot and his scarf flapping in the breeze. The small ships have proven themselves in flight and in ease of transport. Harold Bonner gave demonstrations, using double compound escapements, and advanced radio receivers were shown by various club members.

August 21 and 22 are the dates for the Great Lakes Regional RC Meet. END

Laminated Props

(*Continued from page* 15)

they do so about an inch from the hub end, so while leaving that portion at maximum thickness, you can safely make the blade very thin toward the tips. Because of the ply effect of this type of construction, blades of this type will prove to be far more rigid and warp resistant than carved blades of equal thickness. We usually make our blades about 1/16 in. thick at half the radius and tapered to a sharp edge at the tip and edges.

After sanding is completed, the reverse side is covered with paper. Then the front face is covered. This is done by placing the blade on the form and doping the paper to the middle portion of the blade first. Then work toward either end of the blade, pressing the paper into place and pressing the blade against the form at the same time. This prevents the covering operation from distorting the blade and helps to preserve its original shape. It will be possible to cover this side with a single piece of paper if the paper is slit lengthwise for an inch or two at each end to prevent wrinkles. The covering should extend to about 1/2 in. from the axis of the folder hinge.

A wire hub is made as shown in the illustration. One piece of wire serves as shaft, winding, loop, and one hinge. Another piece forms the other hinge. If you want a single-blader, this second piece can be extended to hold the counterweight. Note that the second piece has a slight kink where it joins the first piece and that it passes through the winding loop. The joint is wrapped with wire and solder is sweated over the joint. This type of hub has proved to be very sturdy and does not allow the blades to twist even if the soldering fails (which has happened only in case of a poorly soldered joint) because the kink in the shorter piece prevents any twisting as long as the wire bending remains in-

tact. Be sure the hinge portions are bent toward the direction of rotation so that the blades do not tend to fly off in flight. The position and angle of the hinges will depend on the size and shape of your model's nose and can best be determined either by experience or by comparison with another prop.

When you have determined the hinge position, the blade is built up to about 1/4 in. thickness at that point using small pieces of scrap balsa. Finish these off so their faces are perpendicular to the axis of the hinge. A hole about 1/16 in. in diameter is drilled where the hinge will pass. A piece of 1/16 in. plywood about 1/4 in. square with a 1/16 in. hole in the center is cemented to either side of the blade in line with the previously drilled hole.

Next the blade is mounted on the hub and before the cement dries, the blade is carefully balanced for pitch and radial alinement. This may be done by lining it up with a prop you already have, or making a simple jig. While lining up the blade, you will probably widen the hole in it but the plywood pieces will slide with the hinge wire. When these pieces dry in their final position, they will keep the blade at its proper pitch. Any excess length is now cut off the hub and the cut end is smoothed. A stop is added to prevent the blade from swinging forward beyond its unfolded position. A piece of straight pin backed with a small piece of ply serves very well. The hub end is now coated with Ambroid and can later be painted or papered to match the rest of the blade.

Now return to the form. Cut away enough to allow for the balsa and ply at the hinge against the form. Cutting this portion away will not impair the usefulness of the form for making other blades. Now, with a 1/16 in. drill, carefully extend the hole in the blade into the form, making sure the blade remains in its proper place on the form. If a drill press is available it will be easy to block up the form to the proper angle for drilling, but with care a hand drill can do the job. If the first try is not satisfactory, plug the hole with a match stick and try again.

From now on you can make any number of blades exactly alike. Proceed as before to the point where the pieces of ply are cemented to the hub. Now put a piece of 1/16 in. wire in the hole in the form and slip the blade over this. Adjust the blade so it fits properly against the form. When the cement holding the plywood dries, the axis of the hinge hole will be just as in the original blade and all blades will be perfectly interchangeable.

The prop blades are slipped on the hub and kept in place by tying a piece of rubber band around the end of the hinge wire. In case of breakage the rubber is slipped off, the blade is removed, and another substituted. When you get the chance you can cement together the damaged blade. Before the cement dries, put the blade on the form, using a piece of 1/16 in. wire through the hinge hole and hole in the form to maintain the original shape. When it dries the blade will be as true as when it was first made. A couple of splints of bamboo across the joint will result in a blade that is actually stronger than a new one.

In Wakefield events where props may be interchanged these props will prove to be just the thing as changing blades will make almost no difference in the performance of your model. While it is virtually impossible to find uniform prop blocks large enough to make the big props popular with Wakefield fliers today, it is usually easy to find several balsa sheets of almost identical characteristics in any hobby shop. By buying enough wood you can make several blades that will turn out to have almost exactly the same weight.

Another most important fact is that these props weigh very little. We made many Wakefield prop assemblies (up to 22 in. diameter) weighing .6 oz. complete with the blades alone weighing about 1 gram (about 1/28 oz. each). These props were as efficient as any props we ever used and when backed up by a few spare blades, they proved to be virtually indestructible. If you plan to make more than one Wakefield, make the noseblocks and prop hubs identical, positioning the hole for the prop shaft by means of a jig. Make all thrust adjustments by cementing packing to the fuselage instead of to the noseblock. Then you will have a nearly perfect set-up. Both noseblocks and prop blades will be interchangeable between models and a few bad take-offs or even a couple of nosedives will not put you out of a contest if the rest of the model holds up.

The system described is an extension of a method developed several years ago. Time has shown that these blades hold their shape better than carved ones do and they are much stronger at the same thickness and weight. Making blades in this manner will enable the younger modeler to make excellent props without the difficulties of carving. By using a machine-cut prop for a form he can build and fly models without having to learn to carve props first—a fact that should prevent many youngsters from giving up rubber models in discouragement over prop carving.

The form takes less time to carve than a single blade. After it is finished it may be used for any number of blades which can be made in an actual working time that is far less than the time required for carving. Given a certain pitch, many sizes of prop may be made from the same form. For example, we decided on a four-bladed 10 in. diameter, 20 in. pitch, prop for the PAA rubber event at the last Nationals. It took only a few minutes of actual working time to make each blade, using a form originally made for 16 in. props.

All of our props have been made by this method for over two years now and it really

works. These props have all the advantages and few of the disadvantages of carved props. Why not make yourself a batch of blades for next summer? From then on you can laugh at broken props. They couldn't bother you less—unless you build nothing but gliders!

Foreign Notes

(*Continued from page 33*)

is the new .06 cu. in. D-A motor, of which advance news was given some months ago in this column.

Japanese Twin-jet

Some people can start pulse-jets quickly. Many others cannot. To expect these people to start two of them on a twin-engined job would be asking too much: one jet would melt before the other got going. So the invention of Mr. Hagiwara of Tokyo, consisting of a divided tail pipe, seems to be an admirable solution. The prototype unit was installed in a controlline scale English-Electric Canberra twin-jet bomber, the dual tail pipes passing obliquely through the wing center-section panels and into the dummy engine nacelles. Construction had, of course, to be of metal around this point. This twin tail pipe is being patented and will shortly be marketed. It is said to be adaptable to most existing jet motors, including the Dynajet and Japanese O.S. jet.

Progress Report on Twin Jetex

No starting troubles attend twin Jetex-powered jobs, but the bother here is insuring that each motor gives precisely the same thrust. The Jetex Experimental Department has been dealing with this problem. First experiments were based on linking two motors together by means of a sort of "balance pipe" between the two combustion chambers but, thus far, the results obtained with this have proved inconsistent because of slight variations in jet size, caused by partial obstruction from incomplete wick ejection and carbon formation.

Jetex now has a new approach which, oddly enough, is similar to the pulse-jet arrangement just described. They now plan to use a single power unit, with a separate ignition chamber and two outlets led from a common combustion chamber. In this way, identical thrust should be obtained from the two jets and clogging should be obviated.

Compass Steering Unit

Compass steering isn't new and, in fact, there are contests for compass-steering gliders held in Europe, but most of the equipment hitherto used has been heavy and complicated. In contrast, the new Pathfinder directional control unit now being made by Woodside Model Aircraft Supplies of Croydon, England, is light, compact and simple. It consists of a small compass switch, having a disk magnet, jewel mounted, to the spindle of which is attached an arm carrying two silver contacts. Fixed contact points are attached to the base and deviation beyond a certain point from a given course will cause one of two electrical circuits to be energized. Each of these circuits operates one of a pair of magnets. Between them is a flat plate armature hinged on a vertical spindle to which the rudder is linked.

Current for the actuator is provided by a 4.5-volt flashlight battery and the complete gear, battery included, weighs 6 oz., making it adaptable to gliders of Nordic A.2 size and larger. The gear does not provide for a dead straight glide path like that aimed at in the annual Swiss compass-steering contest. So long as the model is heading within approximately 10° of the desired course, the points will remain open and no current will be used. Deviation beyond this, in either direction, causes the appropriate pair of points to close, energizing its respective coil of the actuator and swinging the model back on course. To provide accurate adjustment of the desired heading, the complete compass switch is mounted on a rotating base. END

AMERICAN BOY $1.00
SPAN: 18" For .020 to .074 Eng.
Our U-Control trainer . . . the biggest dollar's worth of model airplane in the world. It's a sleek profile job, 100% complete—100% prefabbed.

MONOCOUPE 90A $1.50
SPAN: 18" For .035 to .074 Eng.
Scale model of America's favorite private plane. Prefabbed kit includes carved balsa fuselage, formed metal cowling, U-Control, etc.

Sun Time is Fun Time

. . . with these action-packed Scientific model thrillers.

NORTH AMERICAN F-82 TWIN MUSTANG

WINGSPAN: 18" FOR .035 TO .074 ENGINES

Just released . . . and already one of our record smashing sellers! It's our fabulous F-82 . . . first time as a control-line, fly-it-yourself scale model. Powers with ONE or TWO gas engines. Many hours of test flying prove this! The model flies like a dream . . . and it's a downright cinch to assemble. The super-prefabbed kit includes Two (2) carved balsa fuselages, Airfoil shaped balsa wing, Two (2) formed plastic canopies, Two (2) pilots, Two (2) metal cowlings, etc. etc. **2.95**

SEE THESE SCIENTIFIC MODELS AT YOUR FAVORITE HOBBY SHOP

BE SPECIFIC SAY—

SCIENTIFIC

SCIENTIFIC MODEL AIRPLANE COMPANY
113 M7 Monroe St., Newark 5, New Jersey

If no dealer is available, add 10c (postage & packing) to cost of model

FREE! Scientific Catalog . . . Contains all our exciting action models: Airplanes, Speedboats, Race Cars, etc.

NO. AMER. AT6 $1.95
SPAN: 18" For .035 to .074 Eng.
Our extremely popular scale model of the AT6 Trainer. Prefabbed kit features carved balsa fuselage, etc.

BOEING P-26A $2.95
SPAN: 18" For .020 to .074 Eng.
An excellent control-line flyer. Prefabricated kit is complete in every detail . . . all parts finished.

PITT'S SPECIAL LITTLE STINKER

WINGSPAN: 16" FOR .020 TO .074 ENGINES

Betty Skelton's championship stunt flyer . . . never before at this low, low price. It's highly colorful — a terrific performer. Prefabbed kit contains carved balsa fuselage, colorful decals, etc. **2.50**

RIVIERA $3.50
For "½ A" Eng., Electric Motors
Authentic Chris-Craft replica with a 12" carved balsa hull and brass metal fittings. All parts finished. Completely prefabbed model.

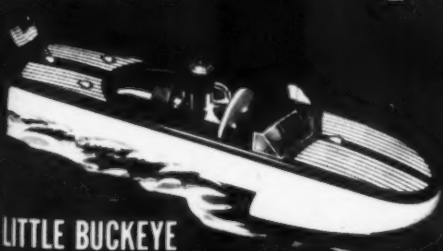
SEA HAWK $2.50
"½ A" Eng., CO_2, or Elec. Motors
Features our exclusive aeronautical fin and rudder design. Prefabbed model has a 12" carved balsa hull, brass metal fittings, etc.

BUCKEYE JR. $3.95
LENGTH: 14" For .020 to .074 Eng.
Full speed ahead for thrills with this "beaut" of a speedboat. Prefabbed model is 100% complete—carved balsa hull, brass fittings.

CURTISS HAWK $2.95
SPAN: 17½" For .020 to .074 Eng.
Deluxe U-Control model of the U.S. Army's famous "Hawk" fighter. 100% complete . . . 100% prefabbed. Contains carved balsa fuselage, etc., etc.

LITTLE MERCURY $1.50
SPAN: 18" For .039 to .074 Eng.
Carved fuselage model — at this sensational low price. It's completely prefabbed . . . easy to assemble, easy to fly. Jim Walker's U-Control.

BOEING F4B-4 $2.95
SPAN: 17½" For .020 to .074 Eng.
Deluxe U-Control model. 100% complete—100% prefabbed . . . with carved balsa fuselage, metal cowl, rubber wheels, pilot, etc.



LITTLE BUCKEYE

Our brand-new speedboat sensation! This sleek beauty powers with any "½A" engine, electric motor or Jetex. Prefabbed kit includes 12" carved balsa hull, brass metal fittings, etc. **1.95**

WACO CABIN $1.50
For .020 to .049 Engines
Imagine! This carved fuselage biplane "beauty" for only $1.50. It's semi-scale. Features Jim Walker's U-Control, all prefabricated parts.

LITTLE MUSTANG $1.95
SPAN: 18" For .020 to .074 Engines
Famous escort fighter model. Completely prefabbed. Features carved balsa fuselage, formed balsa wing, etc., etc.

LITTLE DEVIL $1.50
SPAN: 18" For .020 to .074 Eng.
An economically priced U-Control model. Easy to build and fun to fly. Prefabbed parts include: carved balsa fuselage & wing, etc.

Stratohawk

(*Continued from page* 16)

a small number of strands.

The construction is simple and straightforward; the only time consuming detail is the prop and nose block assembly. Also the airplane is strong and capable of good performance in windy and gusty weather conditions.

The longerons are of hard balsa and the cross braces are medium hard. The motor is held at the rear by a piece of 5/32 OD aluminum tubing. The 1/8 in. sheet fill-ins at the rear strengthen this mounting and help keep the motor centered. The wire wing mounts are bent to shape, and 1/32 in. sheet balsa is filled in as shown. Note that the center of the wire is raised to allow extra clearance for the motor. Then gauze bandage is cemented to the sheet, wrapped around the wire, and cemented thoroughly. This assembly is sandwiched between 1/16 in. sheet formers of the same shape and cemented in the fuselage. The 3/32 in. sq. bamboo runners are bound with thread and cemented to the mounts. Both of these cementing operations should be repeated two or three times to make good joints between the wires and wood. The Venetian blind grommet and the wire hooks to hold the tail also should be well cemented. A 1/32 in. dia. hole is drilled in the grommet for a pin to hold the fuse so that it can't fall out or be pulled out during lighting.

The wing construction is self-explanatory from the plans. Use medium hard stringy balsa for the leading and trailing edges and spars, medium quarter grain sheet for the ribs, soft sheet for the tips.

The stabilizer features split-rib construction which results in a light, strong, and warp-resistant surface. Make a sheet metal template for the upper camber. Slice the ribs from a 2 in. wide sheet of 1/16 in. medium balsa of the exact length as the required chord between the leading and trailing edges. The lower ribs are cemented in place first, then the upper ribs are added. With the stabilizer still pinned to the plan board, add the spar and cement in place. This will insure a flat stab. Note that two upper ribs 1/16 in. apart and a 1/16 x 3/16 in. lower rib are at the center to provide a mount for the fin. The fins are 1/16 in. medium soft quarter-grained balsa.

This is the most important part of the airplane. Lay out the prop block as shown and saw on the dash lines with a jig or band saw. Try to lay out the prop from a medium soft balsa block so that most of the blade will be quarter-grained when carved. Drill the hinge hole 1 in. from the center and at a slight angle (looking from front view) so that the blade will fold flat against the fuselage. Starting with the undercamber first, try to carve a true airfoil section similar to the NACA 6409 wing section. The maximum thickness is 1/8 in. and the maximum undercamber is the same. After carving and sanding, cement the hinge tubing and build up a fillet of plastic wood around each end. Cover with tissue and apply several coats of dope and talcum mixture for a good finish.

The nose block is a lamination of several sheets of balsa, cemented and compressed in a vise, and hollowed out with a rotor tool. If possible try to drill the shaft hole with a lot of built-in down- and right-thrust. Insert the shaft tubing and solder to a washer on the front of the nose block and to a 1/4 x 1/2 in. piece of .010 sheet brass on the rear. This brass sheet also has a 2-56 nut soldered to it 5/16 in. from the shaft axis. Into this goes the machine screw and jam-nut used as a prop stop. The corners of the brass sheet should be dug into the wood and cemented thoroughly.

The prop shaft is bent by working at the hinge first, then the winding loop, and finally

the rear end to hold the bobbin. Then the counterweight wire is bent and wire-bound and soldered to the shaft. Both of these wires extend about 1/8 in. into the hinge tubing. Finally, bend the .040 stop wire to the same shape as the shaft to fit the bobbin and bind and solder to the shaft. Install the bobbin and solder on the retaining washer, making sure that the bobbin is free to rotate on the bound wires. I have used this type of shaft assembly for seven years and have had absolutely no trouble of any kind. This open bobbin allows changing motors very easily, and the only drawback is the increased weight created by so much soldering. So use solder sparingly with good flux and a hot iron.

Cover the wing, stabilizer, and fuselage with Japanese tissue and give entire model at least two coats of thin dope. I use a mixture of aircraft dope, thinner, and linoleum lacquer in equal proportions plus a few drops of castor oil per ounce of mixture and analine dye for color. The linoleum lacquer gives a very shiny finish which will really reflect sunlight. The wing, stabilizer, and prop are red and the fuselage and fins yellow on the original model. These colors seem to give the greatest visibility.

A motor of 10 strands of 1/4 in. flat Dunlop, 36 in. long, is used. Dunlop and Pirelli both have a more even torque output than T-56 and make climb adjustments more easily. The model is adjusted to climb right and glide left. This is a controversial flight pattern, but has proved safe if enough right thrust is used to overcome the torque and left turn. The following adjustments are necessary to achieve this pattern: 5° right thrust, 7° downthrust, 2-1/2°, 3° angular difference between the wing and tail, 1/32 in. on left side of fuselage underneath stabilizer, and 1/16 in. left rudder tab. The center of gravity should be approximately 1 in. ahead of rear trapeze wire.

The prop blade folds on the right side of the fuselage, and the counterweight probably helps the left turn. The thrust adjustments, although quite large, don't seem to penalize the performance, since the model has an average and almost constant rate of climb during the entire motor run. Of course the glide adjustment should be made from a series of short power runs, and then the climb should be set by thrust changes only. The glide trim for windy weather can be altered by moving the wing back on the trapeze. END

Snipe

(*Continued from page 12*)

sand. Apply two more coats of filler and sand with No. 440 sandpaper. This will leave an almost glasslike base for your color dope. Mask off the fuselage from the wing and dope.

The original has blue wings, yellow fuse and tail, blue trim-film checks on the nose and rudder. END

?

READERS

NAME *YOUR* PREFERENCE

Every reader of MODEL AIRPLANE NEWS has his own ideas of what should be featured in the magazine. Here's your chance to speak out—just mark your preferences below, clip out this ballot, and rush it to our Editorial Office at 551 Fifth Ave., New York 17, N. Y.

1. Write (1) after feature you like best, (2) for the next, and so on. Cross out those of no interest.
   - (a) MAN at Work.....
   - (b) Can You Handle That Power?.....
   - (c) Snipe.....
   - (d) Laminated Props.....
   - (e) Stratohawk.....
   - (f) How to Make Built-Up Fuselage.....
   - (g) Wild Hair Joe.....
   - (h) Radio Control News.....
   - (i) Design Detail.....
   - (j) Wedell Williams.....
   - (k) Friedrichshafen G-3.....
   - (l) Engine Review.....
   - (m) Before and After.....
   - (n) Tuning the Free Flight Engine.....
   - (o) Three-Views.....
   - (p) Foreign Notes.....
   - (q) Flash News.....
2. Should MAN publish full scale aviation pictures and articles?
   Yes ..... No .....
3. Should occasional boat plans be published?
   Yes ..... No .....
4. Do you like Wylam and Nye detailed drawings of historic aircraft?
   Yes ..... No .....
   - (a) Publish such plans monthly:
     Yes ..... No .....
   - (b) Prefer model material to historic scale drawings:
     Yes ..... No .....
5. I am.....years old.
6. Please add your suggestions:.....
   .....
   .....

Wild Hair Joe

(*Continued from page* 20)

1/16 in. spring wire, and to mount it, slide it between the engine mount and the engine backplate so that when you tighten the engine in place it holds the landing gear also.

Two short lengths of dowel stuck through the fuselage serve to anchor the rubberbands which hold the wing on. To keep the wing from wobbling on the wing platform, sand the bottom of the two center ribs where they are joined by the piece of trailing edge stock until the wing sits solidly on the wing platform.

Color the model to suit your own taste; imitate cabin windows with black dope.

You will probably have to add some weight to the tail to make the model balance. The approximate balance point is shown on the plans.

Flying Wild Hair Joe takes very little skill. Find some tall grass and glide the model first. You'll have to give it a pretty fast launch to check the glide, because the glide is fast. Correct any tendency to turn in the glide with the tab, and you're ready for the first power flight. Start up the engine, run it a little rich, and launch the model straight ahead. If it spins in to the right or to the left, give it some opposite tab and try again (you had better take a few props with you—that's about all you can break). After you get a steady climb, turn to the left under power, you can give it full power and watch it curl up skyward until the power goes off, then a fast glide back down. Incidentally, the nature of the glide depends on how the prop stops, because the model is so small that variations in the prop position will vary the drag and the glide path. If the prop stops in the usual horizontal position, the glide is very satisfactory. Use 5-2 props with the Infant .020, and 5-3 with .035's and .039's.

That's all there is to it, fellows. Take Wild Hair Joe along with you for fun and laughs, especially when you're taking some other job out to test. Then, if the other job doesn't work and needs repairs, you can relax with Wild Hair Joe in the meantime. Have fun! END

Tuning The Free Flight Engine

(*Continued from page* 23)

engine which is designed for maximum efficiency at that speed. The peaking speed is therefore the logical one to use.

Since bhp is the equivalent of 33,000 lb. raised one foot in one minute, it is obvious that more of it will move more weight in a similar time, and since we are concerned with moving a weight of air, then the more bhp we can get, the better. Therefore, purely from the engine standpoint, the high revolutions, with correspondingly high bhp, is what we want.

Phenomenal crankshaft bhp, however, is quite useless unless it can be transformed into equally large quantities of thrust, and the real answer regarding engine suitability rests ultimately with the prop. Is a small prop as efficient as a large one at the business of shoveling air?

The quantitative answer to that is best left to experts on the subject, but broadly speaking, the larger prop is best. However, a modern .29 peaking at 12,000 rpm can produce something like .4 bhp, whereas a .29 peaking at 15,000 turns out around .6 bhp, which is 50 per cent more, and a difference of one inch in prop diameter will normally accommodate the faster engine. Obviously, the 1-in. reduction does not reduce prop efficiency by one-third, so even putting it at a 10 per cent drop, the faster engine will still be 'way ahead on thrust production. To our thinking, this definitely points to using a racing engine for free flight, and the more urge that can be squeezed out of it by tuning, the better. Those interested are therefore recommended to follow the same tuning procedure as described for speed controlline engines in MAN (Apr. '54, p. 22).

A footnote to all this is that the faster you rev, the greater your problems with gyroscopic forces, but then John Bull with his big wind shovels is having just as much fun neutralizing torque. However, the conclusive evidence in favor of high revs was the solid victory of the K & B .15 equipped American team at the International Power Championships last August in England. In the opinion of Peter Chinn, who was fortunate enough to see it at first hand, our team was getting at least 15 per cent more power behind the prop than most other contestants.

Let us now put aside the exhausting business of competition flying and turn to the most pleasurable occupation of all: sport flying. In our opinion there is nothing like a Sunday afternoon which ends with all your models intact in the trunk of the car, pleasant memories of stable realistic flights behind you, all your workaday worries forgotten, fresh air in your lungs, and a good supper ahead of you. That is living.

We will therefore drop the nerve-wracking implications of "tuning" and call it "adapting for sport flying" and assume that the greatest satisfaction comes from scalish models that perform like the real thing and behave, in matters of stability and reaction to trim adjustment, like gentlemen.

Such models offer endless possibilities for the engine gadgeteer, and by making and fitting a simple one-way valve to the crankcase, the resulting pressure supply can be made to operate all kinds of "hydraulic" apparatus such as retractable gear, flaps, sequence control of elevators, rudder and engine, parachutes, banners, etc., with complete reliability. In fact, radio control is nothing but worry in comparison, because as long as the engine runs, the airplane is under control. When the engine stops, control is lost, but gravity takes over In other words, a flyaway is unlikely, and relays, tubes and batteries are simply expensive worries for the other fellow.

The basic requirement is a well-made moderate output engine with good compression and wearing qualities, such as the two-speed Cameron .19. Leakproof main bearings, well fitted lapped piston, and small-sized air intake are good indications of startability and consistently reliable performance. An expensive racing engine is completely wasted in a sport job, and is troublesome to operate, so cost is not an indication of suitability.

A glance at Fig. 1 will show the two alternative methods of arranging a pressure take-off from the crankcase, and of the two, the rotary valve type is easiest to make and most reliable.

The timing of the rotary valve take-off is not critical and for most engines a position at 90° to the intake is satisfactory. The important point is that the intake port must be closed before the take-off port opens, and also that the take-off port is closed before the pistop uncovers the bypass port, otherwise engine efficiency will be affected. The take-off bore need not exceed 1/16 in. diameter.

Fig. 2 shows the principle of the control actuator. A tube conveys crankcase pressure to a standard needle valve assembly feeding the actuator cylinder, and is used to regulate the rate of delivery, and therefore determines the time required to complete a stroke of the actuator piston. The needle settings are very sensitive and critical, and a first class, well fitted unit must be used, with fiber washers under both spraybar flange and nut. A type with a positive shut-off, such as the Cameron assembly, is very satisfactory, but it is most important that leakage past the needle shank be eliminated, and an application of thick grease inside the friction thimble will assure this.

As the mixture enters the cylinder, pressure builds up until it overcomes the return spring. The piston then moves, and by coupling this

movement to control cams, or other accessories, a predetermined sequence of operation is attained. As the piston completes its stroke, a disc soldered to the actuator rod moves a second disc soldered to the bleed valve rod, and consequently opens the bleed valve port from the actuator cylinder. This port should be not less than 1/8 in. diameter, so that the slightest degree of opening will release pressure faster than the needle valve can deliver it. The pressure in the actuator cylinder rapidly escapes and the piston returns, under influence of its spring, to the starting position, at which point the actuator rod disc trips a second valve rod disc and closes the bleed valve. The cycle is then repeated, and continues until the engine stops.

Except for the period when the bleed valve is open, there is virtually no loss of engine crankcase pressure and so the engine efficiency is not impaired. By careful selection of return spring pressure, the return stroke can be made to occur instantaneously, and movement of the connected control surfaces so rapidly, as to have no effect on the model. The control cams should therefore have neutral positions at both ends.

In the event of the engine's stopping when the actuator is in the mid-stroke position, inevitable leakage will allow it gradually to return to rest and neutral. Meanwhile, however, the model will be gliding and control effect will be greatly reduced. However, this is a weakness of the system, as the engine may stop when the actuator is giving full down-elevator, and the results could be spectacular. It is therefore wise to include only control movements of a degree which will not seriously upset the gliding stability. In practice, this is no great limitation, as radio control fans will know, and quite ambitious powered maneuvers can be built into the cams with confidence.

Construction of the actuator is simple if you can get the use of a lathe. If not, the unit could be fabricated from soldered brass. However, turning the main body from aluminum alloy is preferable and quite simple. The cylinder bore should be reamed to a good finish and polished if possible. The bore diameter should be as large as can be accommodated in order to increase the displacement and reduce the needle valve sensitivity. An old neoprene flight timer piston will save a lot of headaches and will dictate the bore size. The displacement can be made up by the length of the stroke, but anything in excess of two inches will lead to spring problems because of the large variation in spring pressure between different points in the stroke. The bleed valve bore should be carefully lapped to a first class fit for the plug, so that free movement is obtained with minimum leakage. The plug is best made from 3/16 in. dia. drill rod, and soldered to an .030 in. music wire extension.

The spring pressure calls for a certain amount of trial and error, and largely depends upon the cylinder bore size, which, in turn, determines the power available at the actuator rod. The input pressure will be almost equal to the crankcase pressure at about 10 lb./sq. in. depending on the engine, which means that with a cylinder cross section of 1 sq. in. you will have 10 lb. pushing on the piston. Subtracting the spring pressure from this gives the power available at the rod, and it will be evident that quite a useful amount of work can be performed. The best answer to the spring problem is to make your own from various gauges of music wire.

Fig. 2 shows a light leaf spring bearing on the bleed valve rod, and this is simply for the purpose of providing friction to prevent the value from accidentally moving from shock or vibration. As will be seen, the unit is mounted on the fuselage formers which serve as guides and supports for the rods. If this method is used, the holes should be a good fit and very carefully alined.

If you are addicted to gadgeteering you will

have seen the possibilities of this system, and will be able to adapt the principles to your own requirements. Additional take-offs from the actuator cylinder at carefully determined points can provide timed power for gear retracting jacks, etc., and also operate a valve for two speed engine control. In fact, if you are intrigued by the system, and have the patience, it could be adapted to aerial photography.

In conclusion, we found in the course of tinkering with this set-up on a 40cc engine, and also on an .049, that the only serious fault lay in a tendency for crankcase oil to clog the actuator needle valve and slow down its rate of delivery, which is the reason for showing the ball valve alternative in Fig. 1. It can be located anywhere on the crankcase, and consequently in the least oily position. However, a certain amount of oil is unavoidable and control cam design should be based on the time cycle obtaining with an oily needle valve.

Meanwhile this concludes the engine tuning series, and the writer sincerely hopes that it has helped you with your problems, or at least been as interesting to read as it has been to write. END

Pen Pals

▶ Medal of courage goes to modeler Edward Soltis, 57 Morningside Ave., Yonkers 3, N. Y., 37-year-old deaf-mute with over 280 models to his credit who would like pen pals . . . So would W. E. Wiese, Tipton, Kan., ages 13-18; Johnnie Kidwell, P.O. Box 524, Dinuba, Calif., 14; Don Brown, 320 N. Main, Medicine Lodge, Kan., 14, ukie; British Marine Jonny Clear, 2584189 LAC, Block G. Room 2, RAF Pembroke Dock, Pembrokeshire, South Wales, U.K., 19, FF . . . Arthur Simmons, 124 Baker Ave., Syracuse 5, N. Y., would like to buy a Super Wasp or Wasp Twin .65 or .60 . . . Can you sell 1/4-in. scale kits of Maircraft Deluxe Douglas DC-3 and Hawk Grumman F7F Tigercat to Lieut. J. H. Dunlop, 3416th St. Sq., Box 1389, Loury AFB, Denver, Colo. . . . .Your spare Rudevator or Superudevator will find a market with Don Haselwood, 141 S. Vine St., Elkhart, Ind. . . . Nolan Schmidt, R.R. 1, Ossian, Ind., will buy a good used o2o Infant . . . George S. Talas, 9622 Wamelink Ave., Cleveland 4, Ohio, is looking for 3/4 and 1/2-in. scale pre-WW II Cleveland and Peerless kits . . . Tell Brent Rider, 1177 Orchard, Mayfield Hts., Ohio, about your Berkeley TR helicopter kit to sell or exchange with his new Spitfire .045, 5-4 prop . . . Donald Hoffman, R.R. 4, Waterloo, Ill., asks $6 for his Mac .19 sport . . . Want to swap? So do: Eddie Lipton, 300 E. 98th St., Brooklyn 12, N. Y., who has a Mac .19 and Cub .074 for Fox .29, .35 or OS29; Dennis Thomas, Box 282, Moutain Home, Idaho, "excellent" O & R .60 for Arden .19 ball bearing . . . "Tony Boy" De Luna, 1488 E. 15th St., Brooklyn 30, N. Y., new Dyna Jet for two K & B .19's; Eddie Mebus, 2148 Woodlawn Ave., Glenside, Pa., Space Bug, Jr., and Jetex 50B for new K & B .035; Michael Radgett, 539 Selby Rd., Whitkirk, Leeds, Yorkshire wants plan for Musciano's Curtiss Fabulous Hawk . . . Gordon C. Woerner, R. 2, Box 247-A, Orlando, Fla., has almost new North American Twin-Tube receiver, Sigma 4F relay, escapement at $16 and two good Super Aerotrol receivers at $8 each . . . P. Townsend, 8 Blackwall Rd., Willesborough Lees, Ashford, Kent, England, 38, likes historical, bipes, scale, photo collections . . . Can you help Harry E. Marsh, 1524 Sharon Pl., San Mateo, Calif., find plans for 6 ft. 4 in. flying scale Howard DGA-8, four place mono . . . R. Watson Laing, 21 Yewbank Ave., Broughty Ferry, Angus, Scotland, is looking for American pen pal, c/1, glider . . . Racing plane fan Charles Mandrake, 434-1/2 Center St., Ashtabula, O., seeks pen pal with similar interest.

Engine Review

(*Continued from page* 30)

views on Diesel versus glow. Meanwhile, on a note of bewilderment, it can obviously be said that Herkimer has produced another winner.

The new Cub is, in fact, the most gentlemanly Diesel in our experience. On small prop sizes it is notably free from the tendency to "bite" the fingers during starting, except when hot and flooded, and both hot and cold starting are quite easy without priming. However, choking is very uncomfortable for a hot start, and the best method of avoiding the hazards of over-priming, with resulting sore fingers, is to cover one of the tank vents when the tank is full, and give an extra squirt with the fuel pump. This forces a drop or two of fuel into the carburetor and usually gives instant hot starts.

TEST: O.K. Cub .049 Diesel

Fuel: 30 per cent SAE 70 Shell Oil, 40 per cent Shell Diesel Fuel Oil, 28.5 per cent ether, 1.5 per cent amyl nitrate; Running Time Prior to Test: 1-1/2 hours; Bore: .420 in.; Stroke: .360 in.; Weight: 1.6 oz. (with tank, less prop).

	.049 *Diesel*	.049*X*
6-1/2 x 3 (Prop Supplied)	12,500	
Power Prop		
6 x 5	10,500	9,000
6 x 4	11,700	10,200
6 x 3	14,000	12,800
5-1/4 x 5	12,800	11,500
5-1/4 x 4	13,700	13,000
5-1/4 x 3	15,200	15,400
Top Flite		
6 x 5	9,750	8,250
6 x 4	11,100	10,000
6 x 3	12,500	11,600

END

MAN at Work

(*Continued from page* 6)

Hand-Launched Stick Model — Class A (30 sq. in. wing area or less), microfilm covered (introduction to microfilm on a type with which he is familiar and which may be covered easily);

Hand-Launched Stick Model — Class B (30-100 sq. in wing area), covering material optional (the advanced model-event restricted in practice to large meets and experienced builders).

"It is my opinion that the autogiro, ornithopter and helicopter classes should be retained and ROG abolished, but these are not important issues. Insofar as the first factor, that of local and club leadership, is concerned, only with renewed interest and enlightenment at the average modeler's level will changes take place. It is on this that indoor flying will die or thrive."

The Oakland Cloud Dusters, of which Roth is a member, think the Roth article puts them on the spot as recommending "mike" be dropped. Joe Bilgri, presumably the spokesman, wants it made clear that: (1) Should We Scrap Microfilm? is strictly Roth's viewpoint and not that of the Dusters; (2) The Oakland Cloud Dusters are not against microfilm models and are using paper covered indoor models to build up experience for the non-film members of the club before scheduling any microfilm contests; (3) Carl Rambo was misquoted as well as not being in agreement with article. This statement is duly reported to keep the Golden Gate boys from blowing their stacks while we await Round Three in the Battle of Microfilm. Congressional hearings have nothing on us!

Meanwhile, MAN at Work thinks that indoors is practically dead, that status quo

thinking insures its ultimate demise, and that calm, middle-of-the-road thinking, evidenced by Vargo, De La Mater and Schoenky, could spark a constructive movement to allow the rest of us to fly models indoors as well as outdoors. Outdoor flying sites are scarce in many areas, non-existent in others, whereas a usable inside area exists in virtually every populated center, from a crossroads to a metropolis. And all manner of things can be flown indoors, where and how depending on many conditions, such as the FAST club's cute Half-A team jobs, round the pylon rubber, gas, or jetex and indoor scale. They do these things in less mentally muscle bound countries.

If the handful of talented wizards with an armory at their disposal want to fly the gossamer jobs, let them. Every man to his liking. Who can say that Roth is wrong? Even if, in some opinions, he overshot the mark, Hal gets our vote of approval for having the daring and vision to make a constructive suggestion. Heard any others?

* * *

▸ And here's another idea to kick around — speed boys, hold your fire! Seems that Charles (Chick) Blood, A/1C USAF, yearning for speed yo-yos that look like airplanes, thought this up, all by himself. It's a scale speed event, one airplane against the clock, unlike team racing where ships compete against each other. Chick favors minimum over-all lengths and wing areas for each class, as, for example, 18 in. and 100 sq. in. in C-D. Being smaller than a team job and with a far bigger engine, it should be a fast stepper. Perhaps the WAM boys will fill us in on their proto flying. How's it work, fellows?

▸ Lawrence (Mass.) Gas Model Airplane Club meets Wednesday nights, Modeler's Haven, 288 Park St. Small, enthusiastic group (16) go in for free flight, RC, U-Control. Contact Bob Lambert at the Haven . . . Oregon Aeromodelers Assn. (Earl Cayton), 879 N. Liberty, Salem, would like to receive various club papers and bulletins. The Association's OAA Digest tells members that a minimum of 100 builders would be required to obtain Lloyd's of London policy amounting to $5,000-$10,000 personal liability and $5,000 property damage, the same policy carried by WAM members at $1.50 a year. The AMA policy covers you at sanctioned meets but, according to the Digest, Lloyd's covers your sport flying as well . . . In Turtle Creek, Pa., the Monroeville Model Flying Club meets every second Monday at Rose Crest Lutheran Church. Specializes in U-Control, but some free flight and radio. Building two 70 ft. circles and one 35 ft. circle. This hot club began last December with 22 members, now has more than 70, and wants more! Contact Emerson Miles, 1811 Miller Ave. . . . In Kansas City, Mo., Peter W. Asjes, Activity Director, Flying Fools, 4313 Ralston, R.R. 3, thinks a little publicity would help step up activity. Club has some 30 members; recently put on a controlline model show for the Ford Motor Co. Assembly Plant. Holding second annual flying festival on June 13 . . . Model Airplane Doctors, South Fourth St., Easton, Pa., meet every other Thursday, 7:30, in the Moose home (Moose Lodge No. 45 is club sponsor), and fly every Sunday at the Easton Airport, whose manager, Mr. Braden, says the modelers bring in crowds and boost his business. From our own Cub, Champ, etc., pushing days, recall Braden as the chap who, having put on a demonstration at a country air show, had grass wrapped around the wing tip light on a Piper Cruiser (teach him to fly stunt, boys!). Airport makes swell flying site and there is a fine macadam Ukie circle.

Glenn Stucker (AMA-3841), 3567 Potomac Ave., Cincinnati, Ohio, keeps us posted on his controlline delta ships. Latest is a 60° sweep job and is unusual for the reciprocating

engine, delta addicts usually favoring Dynajets. Glenn is a member of the Cincy Controlliners, Lunken Airport, and Appropriations Chairman, Jet Center Model Club, Evendale, Ohio . . . Latter is a new club started among employes of the General Electric Co., Aircraft Gas Turbines Division. The delta? It flies at 70 mph with a three year old Fox .35, has fast landing speed, and relatively slow response but is otherwise docile . . . New clubs all over the place and that is what we like to hear — this one's the Flying Sparks (not bad!), Elmira, N. Y. Seventeen members, meets West Side Hobby Shop, 1260 W. Church St., every other Friday, business meeting on first Friday of month. Have three good flying sessions on Sunday. Secretary: Harry Harston, West Hill Rd., RFD 1 . . . Several Canadian friends check in, too: Bob Gauther, 2072 Murray St., Niagara Falls, Ont., for the Niagara Aeronauts, meetings local high school. Plan team racing, free flight contests, good flying sites, hope to find gym or hall for a try at indoors (what, no dirigible docks?) Too small to sponsor contests so far, club wants to hear about Southern Ontario and New York State contests.

Please keep MAN the same and no trespassing on railroads, etc., says Bob Howard, 98 First St., Brockville, Ont., who tells us the Brockville Model Aero Club is hot on ukie and has a few good stunt pattern men on the roster. Six-ounce tanks — ". . . when we put them up, we keep them there for a few minutes — about 8½ or 9" . . . And from Western Canada, a swell communique from Frank Rutland, President of Vancouver Gas Model Club, 2344 W. Eighth Ave. (you make us feel good, Frank!). This club, an oldie, began in '35, going steady all the while, and today, one of the biggest and bestest in Canada. Fifty-two members. Mostly ukie, but free flight die-hards go 50 miles to the Sumas Emergency (he ain't kiddin') Air Strip. New Yorkers have a cinch by comparison. Frank's a member of the Board of Directors, Executive Committee, Model Aeronautics Assn. of Canada, currently crusading for a free band for RC. And where have we heard that before? Controlline sessions first, third Sundays at private park, fenced by grandstand, permission Park Commissioners. Flying in city parks there taboo since 1947. Thanks, Frank, for The Hot Head bulletin, card, etc.

▸ Odds and Ends: Have fun, go into fuel business. Shortage last winter, Francisco fuels, was caused by a can makers' strike that held up 100,000 containers, a national shortage of nitrates (seems Uncle Sam cuts in on us), and a burglary. What did they steal? Nitrates, of course! (Some modeler really has hot fuel!) . . . Speaking of fuel, two cans of Ohlsson Gold Seal 2,000 Racing Fuel. Commercial racing fuel is good idea — should be better than witch's broth home brews. The 2,000 is mixed for contest-minded modelers. You should give it a whirl . . . Old friend Frank Garcher, "Big Stoop," owner of Midwest. Now Sergeant, White Sands, Las Cruces, N. M., where the military shoots off rockets and Frank and the boys presumably shoot off Fubars. Frank started a club, 25 members now, called the Boonedockers, named after the section where the guided missiles are tested. Always wondered what boonedocks were, so now we've met 'em . . . Ken Johnson (remember the Sheik Team Racer?) says Galesburg, Ill., club flies like mad every Sunday priming for the Nationals. Some new team racers. Ken's done 149 on new jet, 86 in Half-A, says all he needs is another 15 mph. Lotsa new juniors but they converted a 37 year old golfer, Charles Huff, an insurance man who's up to 130 in B speed, and presidency . . . Thanks, John Heiser of H & H Co., Kingston, N. Y., for that field box. Junior takes it down park for flying a Guillow profile trainer with K & B .19 Handy gadget, especially the hidden batteries and convenient switch for booster leads . . . Calling all plane fans: wonderful book containing pictures and specs and many three-views of every plane flying today. Called *Aircraft of the World*, Hanover House, 575 Madison Ave., New York 22. This is the best yet and we've seen them all . . . FAI rules now available; copies may be obtained by writing to Academy of Model Aeronautics, 1025 Connecticut Ave., N.W., Washington 6, D.C. Nordic, Wakefield, FAI gas . . . Amco 3.5 Diesel, courtesy International Hobbies (it's about a .20 displacement), does swell job on an oversize RC job of ours. This engine is really fitted, and takes an old-fashioned break-in. Firm is bringing in new Elfins, 1.49 and 2.49 cc., ball bearing, reed valve jobs, a la Cox. Peak at 14-15,000 . . . Allbon Bambi (.1 cc.), Dart (.5 cc.), Spitfire (1 cc.), Javelin (1.5 cc.), being imported by American Telasco. Bambi is the wee engine shown in Chinn's column couple months back; developed for indoor controlline (what, no dirigible docks?) Also spares, accessories, and water jackets for marine conversions of Spitfire and Javelin . . . Flying ECE, new midget hard tube receiver — it's a dandy . . . Sergio Castiglioni, Milan, Italy, requests correction on chart for Those FAI Gassies, October, '53. Sergio represented Italy, not Switzerland . . . Overheard at the field office, during a WAM meet: "I'm a working

DANA ANDREWS
Co-Starring in
"Elephant Walk"
A Paramount Picture
(Color by Technicolor)

another FIRST from pactra

Aero Gloss

FIRST *Hot Fuel Proof* Dope
NOW—FIRST in *SPRAY CANS!*

Fellows—when you want that championship finish on your model plane, *SPRAY* it on! Use *pactra* Aero Gloss *SPRAY*—it's

- TRUE AIRPLANE DOPE
- REALLY HOT FUEL PROOF
- BINDS TO SURFACE
- QUICKLY PATCHABLE
- SMOOTH HIGH GLOSS

In 10 Brilliant Colors

Silvaire Aluminum	Stearman Red
Taylorcraft Cream	Cub Orange
Sanding Sealer	Swift White
Stinson Green	Cub Yellow
Metallic Blue	Jet Black
Curtiss Blue	Clear

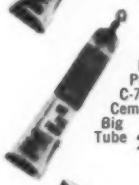
Full 12 Ounces $1.95

Re-Usable NO-KLOG Trigger Valve 19c

...AND SON STEVE

ST

Hot Fuel Proof Plastic Balsa Big Tube **30¢**



Hot Fuel Proof C-77 Cement Big Tube **25¢**

Aero Gloss Plane Kleener 8 oz. Can **50¢**

Aero Gloss Hot Fuel Proof Clear Dope Economy Pint Can **$1.59**
8oz. Can **$1.00**

Aero Gloss Hot Fuel Proof Transparent Colors 4oz. **60¢**
1oz. **20¢**

Aero Gloss Rubbing Compound 1¾ oz. Can **40¢**

Aero Gloss Hard Gloss Wax 1¾ oz. Can **40¢**

FIRST IN *SALES*, FIRST IN *QUALITY*, FIRST IN *PERFORMANCE!*

First in the field, *pactra* Hot Fuel Proof Dope has never been duplicated! No other model airplane dope is made to the same formula as Aero Gloss. Developed by *pactra* chemists back in 1946, Aero Gloss Hot Fuel Proof Dope is manufactured according to a secret formula that is exclusively *pactra's*.

When you want the finest Hot Fuel Proof Finish for your model plane, choose the *true airplane dope* recommended by dealers and used by more trophy-winners than any other.

It's The Drop of Secret Formula That Makes Aero Gloss *Different...*

pactra CHEMICAL COMPANY

1213 No. Highland Avenue
Los Angeles 38, California

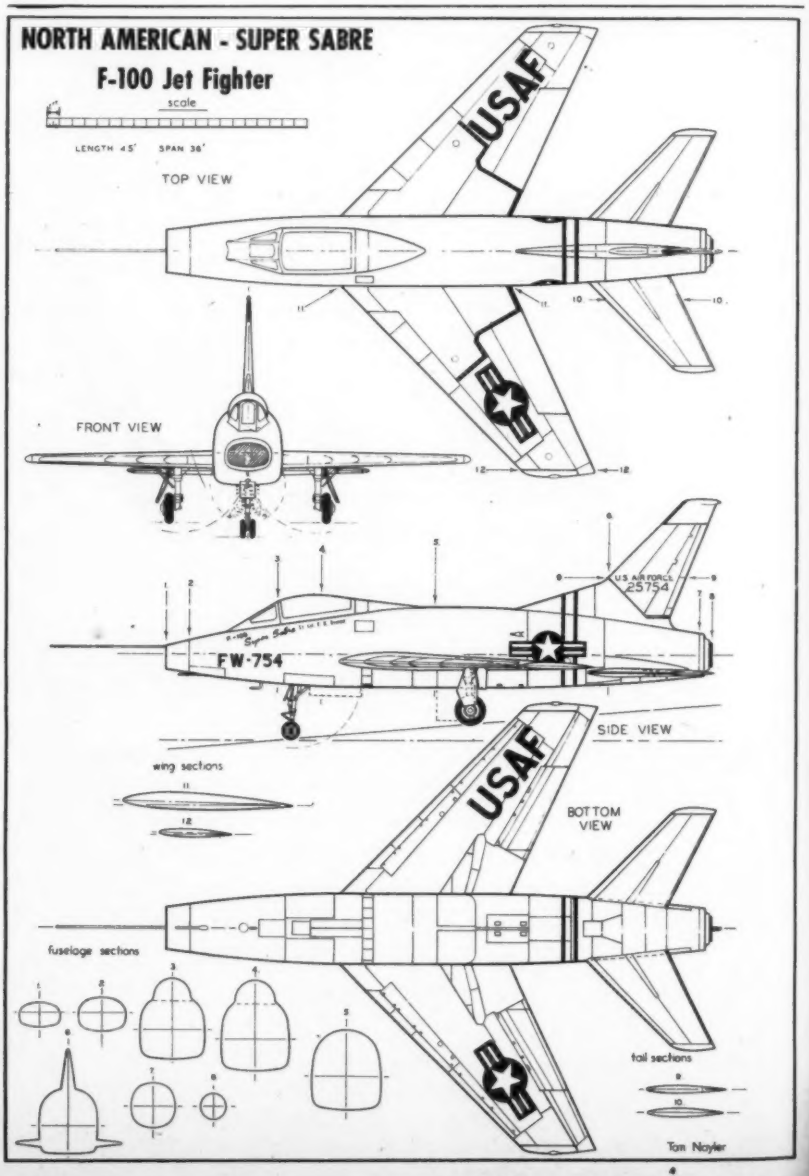
ADVT. INDEX, JULY, 1954

A-J Aircraft	1
Ace Products	39
Akron Motors	50
All American Model Motor Exchange	50
Allyn Sales Co.	39
American Telasco, Ltd.	51
America's Hobby Center	4, 5
Atwood Motors	6
Austin Craft	49
Babcock Radio Engineering	8
Berkeley Models, Inc.	55, 56
Bonner Specialties	42
Carter Craft Models	48
Cheminol Corp.	42
Comet Model Hobbycraft	38
L. M. Cox Mfg. Co.	48
Crafts and Hobbies	46, 48
D & D Mfg. Co.	44
DeBolt Model Engineering	35
Dealer Directory	52
Dyna Model Products	42
Ecco Mfg. Co.	48
Electronic Consultants Engineering	33
F-B Model Co.	42
Forster Brothers	33
Fox Mfg. Co.	34
Francisco Laboratories	2nd Cover
Paul K. Guillow	40, 41
Great Lakes Battery	50
Gull Model Airplane Co.	44
Gyro Electronics	42
E. M. Harmon Electric Co.	50
Henry Engineering	49
Herkimer Tool & Model Works	3
H & H Company	50
K & B Mfg. Co.	3rd Cover
Kenhi Model Products	32
M. C. Mfg. & Sales Co.	50
McCoy Products Co.	4th Cover
Mod-Ad Agency	4
Model Airframe Accessories	51
Model Covering Co.	48
Model Trains	38
Monogram Models	47
Ohlsson Mfg. Co.	54
Pactra Chemical Co.	53
Radiomodels	6
Scalemaster Model Co.	48
Schmidt Radio Controls	52
Scientific Model Airplane Co.	43
Sterling Models	36, 37, 45
Super Control	51
Testor Chemical Co.	28, 29
Top Flite Models	8

man and when I come home from a hard day's work, what do I find? A nice dinner? Heck, no, she's out flying! Do I retire early? Heck, no! She's got to finish an airplane for Sunday. That's my wife."

* * *

▶ The Walla Walla Gas Bugs have accumulated an old American Ace powered by an Arden .09 which was lost at a contest in 1950. An attempt was made to return it to its owner, C. E. Harmon, Pendleton, Ore., but he, alas, had moved and left no forwarding address. Said American Ace is reposing at Rook's Hobby Shop, 1510 Isaacs Ave., Walla Walla, Wash., awaiting Mr. Harmon. END



Berkeley MEANS THE BEST

RADIO CONTROL EQUIPMENT & MODEL KITS!

27 m.c. Crystal Control

"SUPER AEROTROL"

RADIO CONTROL

NO OPERATORS LICENSE REQUIRED!

"Super-Aerotrol" is the original 27.255 Citizens Band Radio Control. Since its introduction, it has outsold all other makes. We have tested many modifications of the original "Super-Aerotrol" but present "Super-Aerotrol" under equal conditions cannot be out-performed by any similar type equipment.

COMBINATION OFFER

DE-Super Aerotrol Combination Kit—#201-K

Combination Receiver-Transmitter Kit that sells for **$29.95**

Includes everything found in both DE-202K and DE-203K Kits. By buying them together it saves you **$3.95**

.14 to .23 Engines — 62" Wingspan

Dr. Walter Good's

"ROYAL RUDDERBUG" $6.95

The entire model building world knows and respects Dr. Walt Good, many-time National R.C. Champion and re-knowned physicist. His new design is the best size for all-'round performance with single channel equipment.

The newest version of one of the most popular R.C. jobs ever designed. Simplified in construction, and improved in performance. A fine kit, produced to Berkeley's standards of completeness and engineering exactness.

READY-TO-OPERATE

SUPER AEROTROL

Including: **$49.95**

TRANSMITTER; ANTENNA; RECEIVER; ESCAPEMENT; & O-3 MILLIAMMETER.

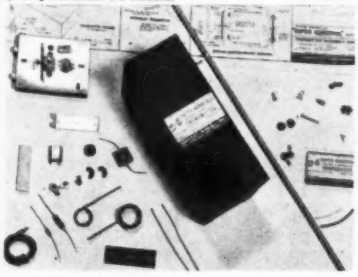
Super Aerotrol Crystal Controlled

TRANSMITTER

In Kit Form less tube **$19.95**

- Portable — Self contained — No separate antenna — No external Batteries!
- Operates on 27.2 mc. • Weighs 3.5 lbs.

Kit includes all necessary parts (except tube and batteries): Precision Ground Crystal; Painted Metal Cabinet; Finished Sectional Antenna; stamped and formed chassis with all holes punched; all necessary components, resistors, condensers, coils and chokes; color coded wiring. Can be assembled in less than two hours. Complete building and operating instructions are included.



"Super Aerotrol" Dust Core Tuned

RECEIVER

In Kit Form less tube **$13.95**

- NEW "locked-channel" dust-core tuning.
- Light in Weight, 2¾ oz. less batteries.
- Super-regenerator circuit, dependable.

Kit includes: Finished, tested sensitive relay; finished dust-core tuner; drilled bakelite base with condensers and eyelets attached; all electrical components, condensers, resistors, coils, chokes and potentiometer; all necessary contacts, and color-coded wiring. Can be assembled in less than two hours. Complete instructions are included.

$3.95

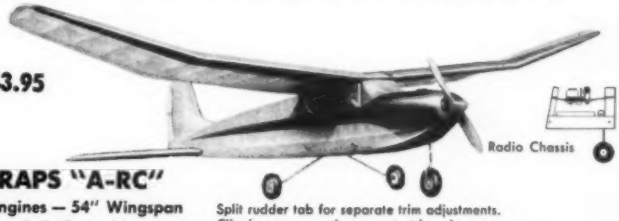
Variable Camber Wing for Radio Control Flying!

Slotted flaps may be depressed 10° for free-flight; depressed 25° for slow speed radio control flying; or raised 5° for high speed radio control flight.

Army Liaison YL-24

"HELIOPLANE"

For .049 to .14 Engines 38¾" Wingspan—1" Scale



$3.95

BOOTSTRAPS "A-RC"

For .09 to .14 Engines — 54" Wingspan

(Empty weight 21 oz. — Radio, Equip., 14 oz. max.)

Split rudder tab for separate trim adjustments. Clip-in prone engine mount, tri-cycle gear.

SEA BIRD "RC-28"

"A-B" Race Boat —

For .09 to .35 Engines — 28" Length

$3.95

- Pre-Fabricated Mahogany Veneer Covering
- Completely Pre-Fabricated Balsa & Plywood
- Full Size Plans Including Radio Control Details

Designed for Radio Control!

The Sea Bird "RC-28" was designed for use either with or without radio control. Simple to build, it enables the builder to race the boat the next day after he buys the kit!

buy **BERKELEY** at your local dealer!

If no local dealer is convenient, mail orders will be filled by Berkeley Model Supplies, Dept. MA, West Hempstead, N.Y. Please include 25¢ packing & postage.

NEW CALIFORNIAN FREE-FLIGHT...

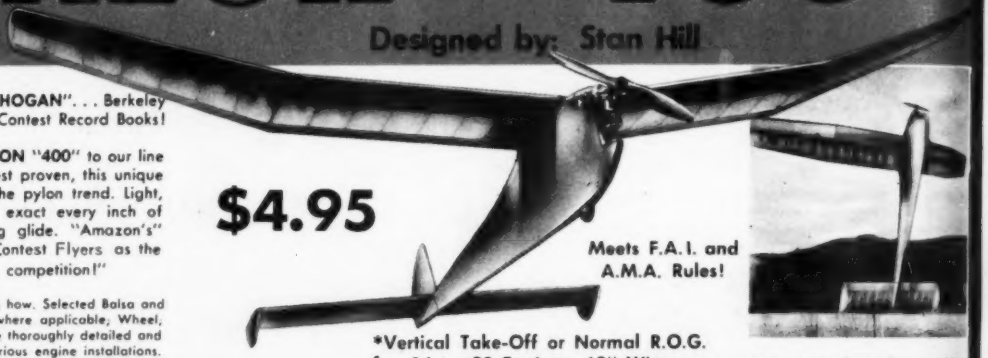
Just in time for the Contest Season...

Berkeley's

V.T.O.

AMAZON "400"

Designed by: Stan Hill



"BUCCANEER"..."POWERHOUSE"..."HOGAN"... Berkeley has made these names a legend in the Contest Record Books!

Now we take pride in adding the **AMAZON "400"** to our line of contest craft. Thoroughly tested, contest proven, this unique aircraft is a refreshing departure from the pylon trend. Light, rugged and efficient, it is designed to exact every inch of altitude possible for its thermal soaring glide. "Amazon's" near vertical ascent acclaimed by British Contest Flyers as the "Fastest climbing aeroplane ever seen in competition!"

The kit is Pre-fabricated as only Berkeley knows how. Selected Balsa and Plywood; Die-Cut, Notched and Shaped Parts where applicable; Wheel, Hardware, Covering etc.; and above all Full Size thoroughly detailed and lettered Plans with construction sketches and various engine installations. Construction time is low, a point to consider in the pre-contest rush.

$4.95

Meets F.A.I. and A.M.A. Rules!

*Vertical Take-Off or Normal R.O.G. for .14 to .23 Engines—62" Wingspan

Vertical Take-Off

NEW! Chris-Craft 1" Scale OUTBOARDS...

"16" OUTBOARD CRUISER"

Formed Vinyl Hull and Foredeck

Formed, not molded, from sheet vinyl—the fuel proof, fire and shock-resistant wonder plastic.

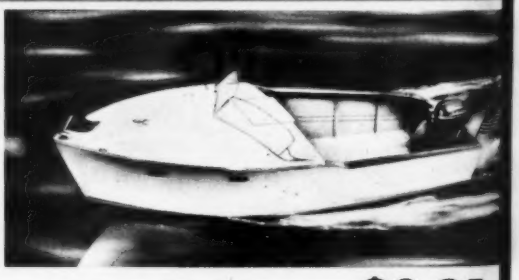
For "½A" & Electric Outboard Engines 16" Long

Featuring: **Formed Vinyl Hull and Foredeck**

(Manufactured under U.S. Patents No. RE 23,171 and 2,357,806)

- Full Size Plans, Instructions
- Die-Cut Balsa Bulkheads
- Die-Cut Plastic Windshield
- Special Plastic Cement
- Plywood Transom Insert
- Cast Deck Hardware

This is the model of Chris-Crafts Newest Kit Boat. It's a perfect design for Electric or Gas powered Outboard Motors. New light construction makes it a top performer with either type power. See it today!



Build it in a little over One Hour! **$3.95**

READY-TO-FLY

NEW! "SUPER YANK"

.035 to .049 Engines—27" Wingspan

Everything completely finished, colored. Even the engine mount is drilled for you.

Bolt in your engine, slip on the nacelle, wing and stab . . . Flip prop and fly it!

READY TO FLY... **$1.95**

Nothing to Build!

buy BERKELEY at your local dealer!

If no local dealer is convenient, mail orders will be filled by Berkeley Model Supplies, Dept. MA., West Hempstead, N. Y. Please include 25¢ packing & postage.

DESIGNED FOR STUNT

K&B...PRODUCERS OF CHAMPION ENGINES

K&B TORPEDO .15

WORLD FF POWER CHAMPION

K&B TORPEDO .19

WORLD SPEED CHAMPION

NOW... Introduces a NEW CHALLENGER

We of K&B Manufacturing Company are proud of our world champion engines. As you know, our Torpedo .19 holds the Class "A" open speed record. Our Torpedo .15 holds both the individual and team power records. Now we introduce a new engine, the Torpedo .35 to challenge the stunt events. Our engineers have put their many years of engine "know-how" into the design of this great new engine. To meet the exacting demands of today's stunt fliers many advanced features have been incorporated into the .35. We are proud of it. We proudly invite you to test it.

SPECIFICATIONS

Bore .790 Stroke .720
Displacement .35 Weight 7½ oz.
Peak H.P. .60 at 14,000 RPM
Recommended prop 10" diameter 6" pitch
Price $14.95

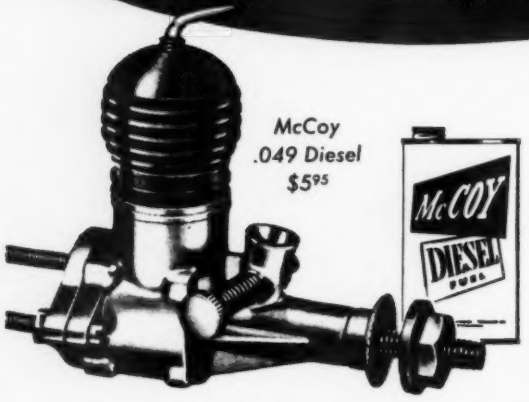
TORPEDO K&B ENGINES

K&B MANUFACTURING CO.

224 East Palmer St., Compton, California

The Sky's Full of McCoys

"TO BE A CHAMPION... BEG, BORROW, OR BUY A McCOY ENGINE"



MEET PAA CLIPPER CARGO CHAMPION Hal Roth *of Berkeley, California. His "Blueboy" with a borrowed McCoy Diesel engine set a new AMA record of 23¼ oz. for 42 seconds.*

LET HIM TELL YOU IN HIS OWN WORDS HOW IT WAS DONE:

"I *borrowed* a McCoy Diesel because it has just the right power required for the Clipper Cargo event. And it convinced me... now, I *own* one!

"My ship 'Blueboy' has a wingspan of 72" with 7" chord; stabilizer, 22¾" with 5" chord. Weight without cargo box was 6½ oz.

"Wing and stabilizer covering was pre-war Jap tissue with two thin coats of nitrate dope. Fuselage was sheet balsa with one coat of blue dope... rudders not covered or doped—just raw sheet balsa for weight reduction. Wing construction was normal—a 1/32" sheeting on leading wing edge for rigidity but light weight. This was necessary because of the high aspect ratio—better than 10 to 1.

WHEELS ARE IMPORTANT—"Landing gear was a two-strut type made of 1/16" piano wire. Two-strut gear is more rigid, lighter, and easier to securely mount than corresponding one-strut gear. Also, two strut gear stays in alignment. Location was immediately forward of the cargo box or considerably aft of usual gas model landing gear installations. Aluminum wheels were made by a fellow Oakland Cloud Duster. They are 1" diameter and 1/32" thick with 1/8" diameter hub, 1/4" wide. Wheels are true running and wobble free because of wide hub and don't squash as do ordinary rubber wheels. Inasmuch as take-off run is some 30 to 40 feet, wheels are important.

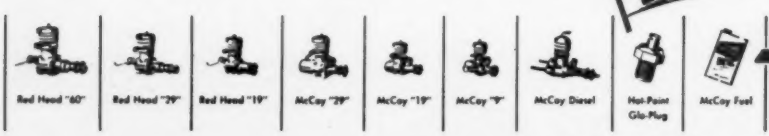
PROPELLERS COUNT TOO—"Various propellers were tried. One, the winning flight of 23¼ oz., a 7x3 Top Flite was used. A 7x2 Tornado worked well also and allowed engine to develop more RPM. On an unofficial flight (due to engine over run) the ship lifted 26½ oz. with a 7x2 Tornado for 2:40. The more load, the more effective pulling power required *from a standstill.* This is best had by a low pitch prop.

McCOY DIESEL JUST RIGHT—"A McCoy Diesel had just the power required—ability to swing a low pitch 7" prop at high RPM. McCoy fuel (which is excellent in all respects), allows use... and broad use... in not only McCoy Diesel engines but all other Diesels, especially foreign makes. Starting procedure is different from glo-plug type and takes a bit of practice to master. Diesels start easy. All in all, the McCoy Diesel has extremely high power, is lightweight and easy to mount. It is capable of much more power than comparable glo-type engines, swings a low pitch 7" prop while glo-plug engines swing a 5x3. The Diesel has another big advantage—fuel residue is not harmful to the model's finish.

BIG FUTURE FOR DIESELS—"In conditions such as at the Nationals, with a good runway and about a 12 MPH wind, I believe the 'Blueboy' capable of lifting 30 oz. dead weight. Above 30 oz., a shock absorbing landing gear will be needed and construction must be stronger. But 30 oz.—about five times the weight of the model—isn't bad."

Hal Roth

McCoy *famous "Checkered Flag" line...*



McCOY®
PRODUCTS COMPANY

8509 HIGUERA STREET ★ CULVER CITY, CALIFORNIA